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FINAL PHASE III RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION

WORK PLAN

REVISION 1 - DRAFT

**ROCKY FLATS PLANT
881 HILLSIDE AREA
(OPERABLE UNIT NO 1)**

ENVIRONMENTAL RESTORATION PROGRAM

**U S Department of Energy
Rocky Flats Office
Golden, Colorado**

ADMIN RECORD

U M

REVIEWED FOR CLASSIFICATION/UCNI
BY <u>G T Ostdek</u> <u>820</u>
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SECTION 1

INTRODUCTION

This document presents responses to U S Environmental Protection Agency (EPA) and Colorado Department of Health (CDH) comments on the Final Phase III RFI/Rl Work Plan for the 881 Hillside Area (Operable Unit No. 1) at the Rocky Flats Plant. The Final Work Plan was submitted to EPA and CDH in October 1990 and written comments were received from EPA and CDH in December 1990. This response to comments is a companion document to the revised Phase III RFI/Rl Work Plan that has been prepared pursuant to these regulatory agency comments. The Phase III Work Plan has been revised to better assure that the RFI/Rl and CMS/FS are conducted in accordance with a plan to which all parties are in agreement. It is noted that the Phase III Work Plan has also been modified for consistency with the revised Final Phase II RFI/Rl Work Plan for Operable Unit No. 2 (to be submitted under separate cover) This consistency in planning is necessary in that comments received on the Phase II Work Plan are often relevant to the Phase III Operable Unit No. 1 Work Plan. The substantive changes to the plan that are not pursuant to a specific Phase III Work Plan comment are noted in these responses to comments.

SECTION 2

RESPONSE TO EPA COMMENTS

GENERAL COMMENTS

EPA submitted comments in October 1990 on the Site-Wide Quality Assurance Project Plan (QAPIP) and the Standard Operating Procedures (SOPs) which together make the Sampling and Analysis Plan (SAP). The SAP comments should have been taken into account in generating the OU 1 Quality Assurance Addendum (QAA) document. A major concern is that the SAP did not adequately address the major QA procedures that will be employed at all the individual hazardous substance sites (IHSS). Much of the basic concepts were deferred to the site-specific QAA and the OU 1 QAA defers to the SAP. The QAA is designed to and must supplement the QAPIP where site-specific information is needed. The QAA provides site-specific information and should have been referenced in the Field Sampling Plan of the workplan. The QAA should state the accessibility of the SAP for worker instruction. These issues must be resolved to EPA satisfaction prior to EPA's final approval of this workplan.

While the nature and extent of contamination section in Chapter 2 does provide summaries of contaminants in the different media, the section should have presented sufficient graphic representation of data in the form of tables, cross sections and plume maps. Even where insufficient data prevents detailed analysis (i.e. plume maps) chemical data could have been plotted along with hydrogeologic data to identify trends, correlations, and data gaps. Trend analyses are lacking. The data that have been collected for over three years at the site could have been used for trend analyses in characterizing the nature and extent of contamination. The information generated through implementation of this workplan must be presented to address this comment in the Phase III RFI/RI Report.

The approach in the revised workplan of evaluating the groundwater conditions by hydrologic unit rather than by SWMU is appropriate as contamination from the SWMUs is likely commingled. However, it is still necessary to define the type of contamination at each source for determining appropriate cleanup methods. It should be noted that the unconfined aquifer can be locally interconnected with the underlying sandstones. Thus, contaminated groundwater from the surficial deposits can be transmitted to the underlying claystones and sandstones.

It is apparent that the Phase I and Phase II site evaluation investigations did not adequately characterize the site in terms of the soil, surface water and groundwater systems. The Phase III RFI/RI investigation must result in an accurate conceptual model of the hydrogeologic system in the vicinity of OU 1. The conceptual model should be developed for an area somewhat larger than OU 1 to account for the fact that physical earth systems are not limited by artificial boundaries.

A site conceptual model is lacking for development of the baseline risk assessment. The text describes a site conceptual model only in terms of geology and hydrology. In the context of the risk assessment, the model should include all media and be based on an analysis of potentially complete exposure pathways. In the RI workplan, the site conceptual model should have been evaluated for likely exposure points. These exposure points should have been considered when sampling and analysis plans were written. For several environmental contaminants, particle size may be important in determining exposure concentrations. Failure to examine appropriate particle sizes may result in under estimation of exposure concentrations. Sampling for extent of contamination over large areas provides little data for estimation of specific exposure point concentrations. If sampling is not extensive enough to detect a "hot spot", it may not be sufficient for estimation of exposure point concentrations in a residential setting where such a "hot spot" might impact 4 to 8 or more homes/living units. This comment needs to be addressed in order to develop an accurate assessment of risk for presentation within the Phase III RFI/RI Report.

A key element is missing from the description of activities for the baseline risk assessment. Before identifying chemicals of concern, a data evaluation step is critical. This step ensures that the risk assessment uses appropriate and reliable data, noting any data gaps or other data problems that contribute significantly to uncertainty. Of particular concern are quantification limits, uses and limitations of qualified data, evaluation of tentatively-identified compounds (if any), statistical analysis of background and increases over background and representativeness of data. The data evaluation develops a subset of all the RI data which is to be used in the risk assessment. This data will then define the chemicals of concern and if necessary provide numerical criteria for reducing the number of chemicals of concern. This evaluation can also identify data necessary to support the risk assessment. This comment needs to be addressed in order to ensure that the workplan will provide the necessary data to support an accurate risk assessment.

The RFI/RI workplan should have addressed the possibility of archeological and historic sites on the plant site and OU 1 (Indian artifacts were found outside of the buffer zone along Rock Creek during Fall 1990). Since the presence of archaeological and historic sites may trigger additional ARARs, this issue must be addressed in the Phase III RFI/RI Report.

The workplan should have included an investigation of the retention pond located approximately 790 feet southeast of Bldg 881 as shown in the October 1984 air photos. It appears that the pond collected drainage from SWMUs 107 and 103. This issue must be resolved prior to submittal of the Phase III RFI/RI Report.

The response to comments (pages 1-1 and 3-1) indicates that supporting documents requested by EPA and CDH will be submitted under separate cover. These documents should have been submitted concurrently with the workplan.

At some point in the RI/FS process, remediation goals (i.e. cleanup levels) need to be established. With the exception of the "no action alternative" the alternatives scrutinized in the FS should be tailored to obtain those goals. The remediation goals should be based on both ARARs and on the baseline risk assessment. That is, the contaminants should be remediated such that their concentrations do not exceed any ARARs and do not pose a threat to human health or the environment. Since it is most appropriate for the remediation goals to be established at the conclusion of the RI phase (at the conclusion of the baseline risk assessment) or early in the FS phase, the RI/FS workplan should have defined a process which would be used to determine the process for identifying those remediation goals.

The document should have set forth the process whereby location specific ARARs would be identified. Potential location specific ARARs must be identified during the RI phase (see 40 CFR 300.430(d)(3)). Action-specific ARARs need to be identified during the FS phase, as appropriate for a given remedial alternative.

There are still many uncertainties regarding appropriate background values for metal radionuclides and major inorganic cations and anions for groundwater, surface water and soil. (Natural background concentrations of major ions may range over two orders of magnitude. Natural background concentrations of metals and radionuclides are a function of the mineralogy of the sediments which comprise the unconsolidated deposits and bedrock which underlie the site.) Comparison of concentrations of metals, radionuclides and major ions to the estimated background levels should be done with caution and this comparison should not be the only factor used to decide if contamination has occurred. In light of the uncertainties, conservative assumptions must be used in the use of any background level unless the existence and genesis of the background level(s) can be substantiated.

RESPONSE

Because these general comments are a summary of the specific comments, the responses provided herein address these general concerns.

EXECUTIVE SUMMARY

Figure 1-6

Preliminary results of the IM/IRA indicate the presence of toluene along the proposed french drain alignment. Follow-up testing has not been completed to verify the presence of toluene. The RFI/RI workplan fails to mention the possibility of toluene contamination. The workplan should have included information from the IM/IRA, and should have proposed investigations to determine nature and extent of toluene contamination. The Phase III RFI/RI Report must resolve this issue.

Indiana Street and Highway 128 should have been shown on the map as these are major roads which bound the buffer zone. As a general practice scales should be included on all maps submitted to EPA.

RESPONSE

At the time the Final Phase III Work Plan was prepared the occurrence of toluene in the French Drain Investigation soil samples was under review and evaluation. It was our opinion, that providing those data in the RFI/RI work plan along with plans to characterize the extent of the contamination was premature and in many ways, "putting the cart before the horse" (the French Drain Investigation Report had not yet been submitted). If the toluene was determined to be a site contaminant, an addendum to the RFI/RI Work Plan would have been prepared. Because the Final Phase III Work Plan is being revised the available data have now been included (Appendix A-1) and discussed (Section 2.3.2) and specific plans have been developed that address the occurrence of toluene in soils at the 881 Hillside Area (Section 5.1).

The map scales and boundary highways are shown on Figure 1.1 in Revision 1 of the Final Phase III RFI/RI Work Plan.

Section 1.3.2.2 Surface Water Hydrology

The section should have been updated to reflect the past and present discharge practices in the Walnut and Woman Creek drainages.

RESPONSE

This section of Revision 1 of the Phase III RFI/RI Work Plan now discusses the diversion ditch from Pond C-2 to the Broomfield Division Canal.

Figure 1.2

The figure should have been updated to show the diversion structures in Woman and Walnut Creeks.

RESPONSE

Figure 1 2 of Revision 1 of the Phase III RFI/RI Work Plan includes these diversion structures.

Section 1.3.2.3 Regional and Local Hydrology

The term descending can be misleading without qualification. The language should have been changed to "Geologic units at the Rocky Flats Plant, in order of descending age are the

RESPONSE.

Section 1 3 2 3 has been revised and no longer refers to descending units.

Section 1.3.2.3 Rocky Flats Alluvium

The extent of the Rocky Flats Alluvium should have been shown (refer to figure 2 2) A cross section should have been added that illustrates eastward thinning of the Rocky Flats Alluvium

RESPONSE.

Figure 1-3 of the Final Phase III RFI/RI Work Plan, October 1990 presents a simplified east-west cross section of the "Surficial Alluvial Deposits and illustrates the limited extent of the Rocky Flats Alluvium Figure 2-3 presents the extent of the Rocky Flats Alluvium in the vicinity of the 881 Hillside

Section 1.3.2.3 Arapahoe Formation

A cross section should have been presented to illustrate the geologic relationships between the units

RESPONSE

A generalized east-west cross section of the regional geology has been included in Revision 1 of the Final Phase III RFI/RI Work Plan (Figure 1-4)

Section 1.3.2.3 Laramie Formation and Fox Hills Sandstone

The thickness of the upper claystone should have been provided Structural controls can allow for penetration of contaminants to deeper units. The workplan should have accounted for this possibility and the remedial investigation must include an assessment.

RESPONSE

The Final Phase III RFI/RI Work Plan states "The upper Laramie Formation is greater than 700 feet thick and is of very low hydraulic conductivity This statement was retained in the revised final work plan No extensive faulting has been documented within the Rocky Flats Plant and for several miles downgradient of the Plant boundary (Hurr 1976 Spencer 1961) In addition Hurr states that faulting in the vicinity of the Plant rarely affect any beds younger than the Fox Hills Sandstone (Hurr 1976)

Section 1.3.2.4 Meteorology

The section should have been updated to reflect the current TRAC model studies. A conceptual model within the workplan should have included a detailed description of the air pathway so that likely exposure points could be identified and monitored. The specific air flow patterns at OU 1 must be addressed in the Phase III RFI/RI Report, as there are variations due to changing topography

RESPONSE

The TRAC model studies and specific air flow patterns at OU 1 will be addressed in the Phase III RFI/RI report. The revised Work Plan presents a site conceptual model that includes a discussion of the air pathway (Section 2.4)

Section 1.3.2.6 Ecology

This section appeared incomplete. A description of the studies that were completed to reach the conclusions provided in this document should have been provided. The description should have included a list of the plant and animal life found in the area. The Environmental Evaluation Plan should have been referenced to show that further work will be undertaken. All conclusions reached and assumptions made in the Phase III RFI/RI Report must be substantiated either within the report or by reference

RESPONSE

This section of the Work Plan now references Section 6.0 the Environmental Evaluation Plan where future studies are described. As discussed in Section 6.0 the first phase of the environmental evaluation will be an in-depth review of previous work in order to lay the foundation for the Phase III environmental studies. The Phase III RFI/RI Report will adequately document and substantiate all findings and conclusions.

Section 1.4.6 Hillside Oil Leak Site (IHSS Ref. No. 107)

The workplan should have included all information regarding any sampling of the oil spill prior to removal to the present landfill. This information must be presented in the Phase III RFI/RI Report

RESPONSE

All available information pertaining to IHSS 107 was presented in the Final Phase III RFI/RI Work Plan. If more information becomes available it will be presented in the Phase III RFI/RI Report.

Section 1.4.9 Page 123

There are no provisions within the Phase III RFI/RI workplan to confirm the presumption that the 4-inch sewer line an outfall pipe from Building 881 was indeed replaced. It seems prudent to perform a dye or smoke test to verify replacement. The Phase III RFI/RI Report must present information to resolve this issue

RESPONSE

The presumption that the sewer line was replaced is based on review of current construction drawings. It is unclear how a dye or smoke test will assist in evaluating replacement of the sewer line pipe. Review of Plant construction records seems a more plausible method of verifying the sewer line replacement, and such a review will be performed.

Section 1.4.10 Building 885 Drum Storage Site (IHSS No. 177)

The section should have referenced OU 10 which contains IHSS 177

RESPONSE

Section 1.4.10 of Revision 1 of the Final Phase III RFI/RI Work Plan references OU 10

Section 2.1 Page 2.1. Paragraph 1

This section states that four bedrock wells were installed during Phase I and Phase II activities. In contrast, Figure 2.1 which shows Phase I and II monitoring well locations indicates seven bedrock monitoring wells were installed. This discrepancy should have been corrected in this workplan and must be resolved in the Phase III RFI/RI Report.

RESPONSE

Figure 2.1 is correct. The text of the revised Final Phase III RFI/RI Work Plan has been corrected and modified to include a discussion of all field activities in the area of the 881 Hillside conducted since 1986.

Section 2.2.1.1 Surficial Geology

The text should have described the surficial deposits in greater detail (see CDH comments p. 3.1)

The interpretation of the geometry of the gravel layers in the alluvium must be verified during the Phase III work. The data from Phase I and Phase II do not allow this interpretation to be made with certainty. It is very important that the existence of these gravel layers and the interpreted geometry be verified during the remedial investigation as the gravels may be preferred paths of contaminant transport.

The workplan should have discussed the origin of the north-south trending swales that drain Hillside 881 and/or should propose investigation of these swales if this is important to the conceptual model of the Hillside. The importance, impact and characterization of the swales if appropriate must be provided in the Phase III RFI/RI Report.

RESPONSE

Detailed descriptions of the surficial geology based on existing and new data will be provided in the Phase III RFI/RI Report as necessary.

The gravel layers in the alluvium and colluvium will be defined by borehole sampling and preparation of stratigraphic cross sections as proposed in the Phase III RFI/RI Workplan and will be included in the Phase III RFI/RI Report.

The swales occur by downward erosion of the hillside caused by surface water runoff from the Rocky Flats Alluvium terrace toward the Woman Creek drainage. The resultant erosional pattern is reflected in the swales and ridges observed.

Figure 2.2

The map should have presented the location of all of the disturbed ground in SWMU 119.2

RESPONSE

All of IHSS 119.2 has been shown as disturbed ground in Figure 2-3 (formerly Figure 2.2) of the revised Final Phase III RFI/RI Work Plan.

Section 2.2.1.2. Bedrock Geology

The terminology "mild fracturing" should have been defined (see CDH comments, pg. 3.2)

RESPONSE

Weathered claystones may typically exhibit a fracture density of 3 to 7 iron oxide-filled healed fractures per foot. Unweathered claystones may typically exhibit a fracture density of 0-3 iron oxide filled to manganese oxide filled healed fractures per foot. This fracture density information was obtained from borehole logs of the French Drain Geotechnical Investigation (EG&G 1990g) and will be provided in the Phase III RFI/RI report.

Section 2.2.1.2. Claystones

The lithologic unit(s) in which the packer tests for well 5-87 were completed should have been stated. Information pertaining to the nature of the claystone and the depths of testing are necessary. Packer test information and results should have been provided for each well and must be provided in the Phase III RFI/RI Report.

What is the orientation of the 45 degree fracture identified in weathered claystone in well 8-87? The Phase III investigation must include looking for any fault traces or fractures in the surface and subsurface.

RESPONSE

Tables 2-3 through 2-6 have been added to Section 2.2.2.1 Groundwater Flow Rates in the revised Phase III Work Plan. These tables include all available hydraulic conductivity data for the 881 Hillside Area.

The orientation of the 45 degree fracture identified in well 8-87 cannot be determined because coring operations were not conducted to retrieve the core in its in-situ orientation. It is our opinion that fracture orientation is not required for characterization of the bedrock, and oriented core drilling is not practical for the planned extensive drilling program.

Section 2.2.1.2. Sandstones

Preliminary cross sections (north-south and west-east) should have been provided illustrating the relationships of the geologic units (surficial and bedrock), wells, boreholes and water levels described.

in the document. The specific data that allowed calculation of the mean hydraulic conductivity should have been provided in the workplan and must be presented in the Phase III RFI/RI Report. The work and anticipated schedule pertaining to OU 1 in the high resolution seismic reflection program and plant-wide geologic characterization study should have been provided. These important studies must be incorporated while developing the Phase III RFI/RI Report.

The Phase I and II data indicate that the mean hydraulic conductivity of weathered claystone (7×10^{-7} cm/s) and weathered sandstone (3.9×10^{-7} cm/s) are about the same. The workplan should have explained this. The Phase III investigation must include more aquifer testing of the weathered claystone and weathered sandstone so that the Phase III RFI/RI Report can present this information.

RESPONSE

Preliminary north-south cross sections were provided in the Phase II RI (Plates 5-2, 5-3, and 5-4) and east-west cross sections of the bedrock are presented in the French Drain Geotechnical Investigation Report (Plate 1). This information, updated with data collected during the Phase III RFI/RI, will be provided in the Phase III RFI/RI Report.

The data used to calculate the mean hydraulic conductivity have been provided in the revised Final Phase III RFI/RI Work Plan.

A high resolution seismic reflection program is not scheduled for OU 1.

During the French Drain Geotechnical Investigation, numerous packer tests in the weathered claystone directly below the bedrock contact were performed. Tables of the results are provided in the revised Final Phase III RFI/RI Work Plan (Tables 2-4 and 2-5). It seems unnecessary to perform more hydraulic tests in the bedrock claystone based on these results. However, with respect to weathered sandstone, Section 5.2.1.3 of the Final Phase III RFI/RI Work Plan notes that hydraulic tests will be performed in all newly installed monitor wells subsequent to development.

Section 2.2.2.1 Unconfined Flow System

The text should have indicated that subcropping claystone is saturated locally. References should have included the page numbers. The data used to determine the vertical gradients should have been provided within the workplan and must be presented within the Phase III RFI/RI Report.

In Section 2.2.2.1 it states that there is a strong downward gradient between groundwater in surficial materials and bedrock. The specific bedrock unit should have been stated.

RESPONSE

Subcropping claystone that locally exhibits a saturated condition has been added to the listed surficial and bedrock geologic units that are mediums for the unconfined ground water flow system.

The vertical gradient data referenced is presented in Table 5-3 at page 5.28 in the RI Report Volume III. This table has been included in Section 2.2.2.1 of the revised Phase III RFI/RI Work Plan.

The bedrock unit referenced is sandstone except at 8-87BR which is completed in lignite and unweathered claystone. This has been included in the Phase III RFI/RI Work Plan.

Section 2.2.2.1 Groundwater Flow Directions

Well 47-87 is north of the Interceptor Ditch. Cross section 2-3 does not extend far enough south to include the south interceptor ditch. This does not support conclusions stated in the text. Additionally, the response to CDH comments (pg 3-2) indicates that the groundwater flows under the Interceptor ditch. This inconsistency should have been corrected in the workplan and must be resolved prior to drafting the Phase III RFI/RI Report.

RESPONSE

The cross section shown in Figure 2-3 in the Phase III RFI/RI Work Plan does include the South Interceptor Ditch, located south of well 47-87. The subsurface geology south of well 47-87 is interpolated based on the next well along the line A-A, 55-87, which is completed in gravelly sand of the terrace alluvium. The exact location of the transition from colluvium to terrace alluvium is not precisely known. The available water level data for well 47-87 indicates that ground water is below the base of the South Interceptor Ditch. This is inferred from extrapolation of the ground-water gradient. Under these conditions, ground water would flow beneath the base of the South Interceptor Ditch. However, during periods of maximum colluvium saturation, it is possible for discharge to occur into the ditch. The proposed french drain will intercept the ground water before it reaches the South Interceptor Ditch, which eliminates the possibility of potential flow into or beneath the ditch.

Figures 2-4, 2-5, 2-6 and 2-7

The water-level data show that well 55-87 is dry yet the 5850 contour interval is illustrated downgradient of the well. The water-level data show that well 47-87 is dry for all four quarters yet groundwater levels are plotted downgradient of the well. The figures in the workplan should have been corrected to illustrate the actual conditions. Well depth information should have been provided. An explanation for the 5950 contour interval loop around well 51-87 should have been provided. These inconsistencies must be resolved in the Phase III RFI/RI Report.

RESPONSE

The 5850 contour interval has been relocated in the vicinity of well 55-87 on Figures 2-4, 2-5, 2-6, and 2-7 of the revised Phase III RFI/RI Work Plan.

The elevation of the bottom of monitoring well 47-87 is 5875.22, which will be the basis for the 5875 contour interval. This contour interval has been relocated on Figures 2-6 and 2-7 of the revised Final Phase III RFI/RI Work Plan.

A table listing well depth and elevation at bottom depth has been presented as Table 2-1 for all listed wells in Figure 2-4, 2-5, 2-6, and 2-7 in the revised Final Phase III RFI/RI Work Plan.

Well 51-87 is located adjacent to the Building 881 footing drain (Figure 1-7). Water levels are higher to the north and south of this well, suggesting that the footing drain is effectively lowering the water table in this area. The effect is represented by the 5950 contour interval loop around well 51-87.

Section 2.2.2.1 Groundwater Flow Rates

The information from packer testing along the proposed french drain alignment designed for the IM/IRA should have been included in this workplan and must be included in the Phase III RFI/RI Report. Data collection was completed several months prior to submittal of this Phase III RFI/RI workplan.

RESPONSE

Tables 2-4, 2-5, and 2-6 have been included in the section of the revised Final Phase III Work Plan that details all packer test information and results. The data were not provided in the Final Phase III Work Plan because the French Drain Geotechnical Investigation Report had not yet been released and the data were still being evaluated.

Page 2 16

It is stated here that well 47-87 was normally dry but some samples were obtained from this well. An explanation for this should have been presented. Were these samples collected after precipitation events? This question must be answered and presented within the Phase III RFI/RI Report.

RESPONSE.

Well 47-87 is completed in the colluvium on the 881 Hillside. The saturated thickness of the colluvium fluctuates with the seasonal precipitation. The dry summer and fall months and the middle of the winter months correlate with dry well conditions. In the spring months, during snowmelt and increased precipitation, the colluvium becomes saturated resulting in measurable water levels in this and other wells. The quarterly measurements, climatic conditions, and sampling procedures for this and all wells will be included in the Phase III RFI/RI Report.

Page 2 17

With respect to the Woman Creek Alluvium a hydraulic conductivity value of 1.5×10^{-3} cm/s is equal to 1552 ft/yr not 1035 ft/yr.

RESPONSE

The correction has been made in the revised Final Phase III Work Plan.

Page 2 18

All of the mean hydraulic conductivity values for the various geologic units should have been included in a table for easy reference.

RESPONSE

Tables 2-3 through 2-6 are presented in Section 2.2.2 of the revised Final Phase III RFI/RI Workplan. These tables present the mean hydraulic conductivity values for all the various geologic units in which drawdown recovery tests, slug tests, or packer tests were conducted.

Section 2.2.2.2, Page 2 18, Paragraph 2

Hydraulic conductivities should have been provided for the Arapahoe Formation claystone. This information will be valuable in estimating the capability for water transport through claystone to the underlying sandstone and must be presented in the Phase III RFI/RI Report.

RESPONSE

Hydraulic conductivities for the Arapahoe Formation claystone have been provided in the revised Final Phase III RFI/RI Work Plan. Tables 2-3 through 2-6 in Section 2.2.2.2 present the hydraulic conductivity values for all geologic units. Hydraulic conductivities for claystone were derived from packer test results as slug tests or drawdown-recovery tests were not conducted in the claystone because there are no wells completed in the claystone at the 881 Hillside.

Section 2.2.3 Surface Water Hydrology

The section should have been updated to reflect the recent changes due to diversion of the drainages. Dates for the surface water measurements were not presented in this section nor referenced (see response to CDH comments pg 3-5)

RESPONSE

The sections on surface water hydrology of Woman Creek (Sections 1.3.2.2 and 2.2.3.1) have been changed to include the Pond C-2 Diversion and the Broomfield Diversion Canal in the revised Final Phase III Work Plan.

Section 2.3.1 Background Characterization

Can temporal variations in water chemistry be determined prior to two years if more samples are taken? The text states that volatile organic compounds were not analyzed for background samples because the sample locations are potentially outside of contaminated areas. The response to CDH comments (pg 3-5) states that background samples will be collected and analyzed for VOCs. The RFI/RI workplan should have mentioned this in this section. Table 2.2 provides information regarding the background surface water tolerance interval upper limits or maximum detection values. The data is for Round 1.7 samples. In the previous RI the data was for Round 1.9 samples and Round 2.7 samples. The difference should have been explained in the workplan and must be resolved in the Phase III RFI/RI Report.

RESPONSE

Temporal variations in water chemistry will be presented in the Phase III RFI/RI Report. Seasonal variability would not be better characterized if more samples were taken over a shorter time frame. As of first quarter 1990 ground-water and surface water samples are being collected in background areas for VOC analysis. The text has been changed to reflect this addition in the revised Final Phase III RFI/RI Work Plan. The surface water tolerance intervals are for Round 1.7 samples.

Table 2.3, Page 2.24

There are discrepancies between the units assigned to background data in the Draft Background Characterization Report (DBGCR) and the RFI/RI workplan. First, inorganic concentrations are given in milligrams per kilogram (mg/kg) in the DBGCR for soils, while the same are given in milligrams per liter (mg/L) in the RFI/RI. In addition, radionuclide concentrations are presented in picocuries per gram (pCi/g) in the DBGCR and picocuries per liter (pCi/L) in the RFI/RI. This should have been corrected in the RFI/RI workplan showing inorganic data as mg/kg and radionuclide data as pCi/g and must be corrected in the Phase III RFI/RI Report.

RESPONSE

The units on both the tables and text have been corrected to mg/kg for inorganic soil data and pCi/g for radionuclide soil data in the revised Final Phase III RFI/RI Work Plan.

Page 2 26

The units on several tables (e.g. Table 2-4) seem to be in error. Either the water concentrations are extraordinary (e.g. 25 g/L of aluminum in Table 2-4) or the denominator (L) is incorrect for the medium (soil).

RESPONSE

The units for sediment samples have been corrected to mg/kg for sediment and mg/L for water in the revised Final Phase III RFI/RI Work Plan.

Section 2.3.2 Soils

The data should have been presented even though unvalidated. The validation of OU 1 sample results should be a priority as the workplan will need to be amended if unexpected results are present. Table 2-5 does not include cesium and molybdenum as sampling parameters. These parameters should have been added to the list.

RESPONSE

The rejected volatile organic data are summarized and discussed in Section 2.3.2.1 of the Work Plan. The data have been presented in previous RI reports and their presentation in the work plan does not provide any additional basis for the Phase III soil sampling plan. Phase III sampling and analysis/validation will provide quantitative information on the nature and extent of contamination in soils at Operable Unit No. 1. Table 2-13 (formerly Table 2-5) of the Revised Final Phase III RFI/RI Work Plan is the list of parameters for which Phase I and II RI soil samples were analyzed. Cesium and molybdenum are included in the Phase III RFI/RI Work Plan parameter list (Table 5-1).

Section 2.3.2.1 Volatile Organic Compounds

The occurrences of toluene in the borehole samples collected along the proposed drain alignment needs to be addressed. The last sentence on page 2-28 continued on page 2-37 is incomplete and should have been corrected. Table 2-6 should have included the contaminant encountered for the direct hit samples. The description in the text should have mentioned the direct hit at borehole 63-87. These issues must be addressed in the Phase III RFI/RI Report.

RESPONSE

The toluene data collected during the French Drain Geotechnical Investigation are discussed in the Revised Final Phase III RFI/RI Work Plan. The incomplete sentence has also been corrected. The volatile organic compounds detected in soils are presented in Appendix A-1.

Section 2.3.2. Page 2 28

A discussion of semivolatile organic compound (SVOC) soil contamination should have been provided in this section which addresses analytical results from Phase I and II investigations. These contaminants will be important to the calculation of risk at OU 1.

RESPONSE

A discussion of semivolatile organic compound results for soils has been added to Section 2.3.2 of the revised work plan.

Section 2.3.2.3 Radionuclides

Table 2.7 should have specified the sample depth intervals. The ratios of U233 + U234 to U238 and of U235 to U238 should have been presented in Table 2-8 (see PRC comments, pg 2-3). Is it possible to conclude preliminarily that the uranium ratios for samples 1-15 are greater than one when dilution from compositing over several feet is possible? Cross sections DO NOT always need to show trends but should display the data. It is extremely helpful to display the data graphically for evaluation purposes. This information must be presented within the Phase III RFI/RI Report.

RESPONSE

Table 2.17 (formerly Table 2.7) is a summary of Phase I and Phase II RI soil sampling results. The surface soil tabulation is based on the uppermost soil sample results from each borehole, and the subsurface soil tabulation is based on soil sampling results from the remainder of all boreholes. Sample depths for all boreholes are provided in Table 2.13.

The information provided in the work plan is sufficient to establish that radionuclide contamination is largely confined to the surface soils. This will be confirmed in the Phase III RFI/RI where an exhaustive battery of tests are proposed to ascertain the extent of radionuclide contamination and the mobility of plutonium in soils. Detailed data evaluation including cross sections as appropriate will be provided in the Phase III RFI/RI Report. With respect to Table 2.18 (formerly Table 2-8) these samples are not composites but are discrete surface samples.

Section 2.3.2.3. Page 2 38

No data should be discarded from further consideration if, by adding the tolerance level (since it is a plus as well as a minus tolerance), the concentration is pushed above applicable or relevant and appropriate requirements (ARARs), maximum contaminant levels (MCLs), or both. As discussed earlier, such concentrations may exceed cleanup levels even though they meet ARARs.

RESPONSE

The text in Section 2.3.2.3 first paragraph (formerly page 2-38) does not call for discarding any data nor does it make reference to ARARs. It is simply stated that a site datum where the error term is larger than the value is below the MDA and cannot be considered statistically different from background, or as suggested ARARs. The MDAs established for the Phase III RFI/RI will provide measurements that allow for meaningful interpretation of the site data relative to background or ARARs.

Section 2.3.3 Groundwater

Well 1-87 water and contaminant data may also indicate another source of contamination and may not indicate that the well is sidegradient. This must be verified through development of the Phase III RFI/RI Report. Of the three wells listed as being dry during all sampling attempts, two of the wells, 51-87 and 54-87 are shown to have sample results (see figure 2 10) Of the 14 wells listed as being downgradient from the 'eastern' SWMUs, well 55-87 is shown to have sample results (see Figure 2 10) The figure should have been consistent with the text and Appendix B

On page 2-42 it is stated that unweathered bedrock is considered part of the confined flow system. A discussion should have been presented to clarify why if the bedrock is unweathered that groundwater is contained under confined conditions. Storage coefficient values obtained from aquifer tests in unweathered bedrock should be used to verify confined conditions. A discussion of SVOC groundwater contamination is not, and should have been, presented in this section which addresses analytical results from Phase I and II investigations. This information must be presented in the Phase III RFI/RI Report.

RESPONSE

The Final Phase III RFI/RI Workplan states, "Wells 1-87 and 68-86 were initially considered upgradient of these IHSSs, but water level and chemical data suggest that well 1-87 may be sidegradient. Ground-water quality in both of these wells is occasionally above background and may be affected by Plant activities upgradient of the 881 Hillside. Additional upgradient wells will be installed to investigate that possibility. These statements were retained in the revised final work plan.

Wells 51-87 and 54-87 were usually dry but enough water was available for sample collection during second quarter 1989. This has been noted in the text of the Revised Final Phase III RFI/RI Work Plan.

The text concerning the 14 wells downgradient from the eastern IHSSs is now consistent with Figure 2 10 and Appendix B.

The statement that the ground water within the unweathered sandstone is confined is based on the water level in the well being above the top of the screened interval, and the top of the screen being at the top of the water bearing strata.

Semivolatile organic compounds were not analyzed for in the Phase I and II sampling events, but will be analyzed for in the Phase III field effort. Results of the semivolatile analyses will be presented in the Phase III RFI/RI Report.

Page 2-43

Why were monitoring wells 51-87 54-87 58-86, 63-86, 44-87 49-87 50-87 and 55-87 always dry? This should have been explained at least preliminarily and may be important to the conceptual model. Was the entire thickness of colluvium dry or were the well screens improperly located?

RESPONSE

Well 51-87 is located adjacent to the Building 881 footing drain (Figure 1 7) and based on the water level data from 51-87 it appears the footing drain is effectively lowering the water table in the area south of Building 881. With respect to the other wells, the entire thickness of the colluvium is dry because the wells are screened over the entire thickness of the surficial materials. Many areas of the colluvium and surficial materials

are observed to be unsaturated based both on the water level data in these wells and the drilling for the French Drain Geotechnical Investigation.

Section 2.3.1.1 Volatile Organic Compounds

Unconfined Groundwater The text should have described the TCE and PCE contamination at well 51-87 as shown on Figure 2-9. The toluene occurrences are not minor as the text implies. Table 2 10 shows toluene present at 270 $\mu\text{g}/\text{l}$ for well 43-87 and 81 $\mu\text{g}/\text{l}$ for well 9-74

RESPONSE

The text in Section 2.3 3 3 of the revised Phase III Work Plan discusses the occurrence of TCE & PCE in well 51-87. The text does not imply the toluene occurrences are minor. It states, "Chloroform, toluene and 1,2-dichloroethene (1,2-DCA) occurred at lower concentrations (estimated) at less than detection limit or less than 100 $\mu\text{g}/\text{l}$ ". The toluene in well 43-87 was estimated below the detection limit and also present in the laboratory blank and the toluene in well 9-74 was also estimated below the detection limit.

Table 2 10. Page 2-47

Units should have been presented for organic data on the second page in Table 2 10 which lists VOCs detected in unconfined groundwater. These data should have been represented in micrograms per liter ($\mu\text{g}/\text{l}$).

This data and data from borehole samples from the OU 1 IM/IRA indicate toluene contamination. The remedial investigation needs to address this. Acetone and methylene chloride occur in a significant number of wells in concentrations one to three orders of magnitude greater than in blanks. Acetone, methylene chloride and other possible lab contaminants should presently be considered as potential contaminants. The remedial investigation must resolve this issue.

The concentration plots for TCE and PCE are useful in evaluating the nature and extent of contamination. Plots of the other contaminants present should have also been presented in the workplan and must be present in the Phase III RFI/RI Report.

It is not clear what high matrix noise is (see response to EPA comments, pg 1 7) and the affect this will have on obtaining quality data from which characterization of contamination can be accomplished. Detection limits should not be set so high that low levels of contamination are masked. The response should clearly present what is well above low-level contract-required detection limits and/or well above CLP-accepted levels for common laboratory contaminants.

Confined Groundwater Data should be graphically displayed and in tabular form for the unconfined groundwater conditions. The data indicate that a potential for contamination is present in the sandstones. TCE was detected at concentrations exceeding the Colorado Department of Health Basic Standards for Ground Water (CDH September 30 1989) in wells 3-87 (6 $\mu\text{g}/\text{l}$) and 8-87 (35 $\mu\text{g}/\text{l}$). Also carbon tetrachloride greatly exceeded the CDH standard in well 8-87 (130 $\mu\text{g}/\text{l}$) on one occasion. The conclusion reached in the RFI/RI workplan stating that groundwater in the unweathered sandstone is not contaminated is premature as the extent of contamination is not yet adequately characterized. This question must be answered through implementation of the remedial investigation.

RESPONSE

The micrograms per liter units are shown on all pages of Table 2-20 (formerly Table 2 10) in the Revised Final Phase III RFI/RI Work Plan.

The occurrence of toluene in soils based on the French Drain Geotechnical Investigation is discussed in detail in the Revised Final Phase III RFI/RI Work Plan

The Work Plan states, "Levels of methylene chloride and acetone were typically low enough to be considered laboratory artifact according to CPL protocol (EPA 1988a) although the high levels at wells 9-74 and 10-74 suggest the actual presence of these compounds in the ground water at these locations. Implementation of the Phase III RFI/RI Work Plan will resolve this important issue.

TCE and PCE occur in the highest concentrations in ground water and are also the most ubiquitous of all the contaminants at Operable Unit No. 1 Therefore TCE and PCE were used to illustrate the estimated extent of organic contamination. Plots of the other contaminants will be presented in the Phase III RFI/RI Report.

Results of data validation and evaluation for Phase I and Phase II RI data, as well as ongoing quarterly ground-water sampling data will be presented in the Phase III RFI/RI Report. Detection limits and analytical methods for the Phase III RFI/RI field work are presented in the QAPP (EG&G, 1990f) and GRRASP (EG&G 1990j) These detection limits will allow for evaluation of site data with respect to ARARs.

The Phase III RFI/RI Report will establish the presence of volatile organic contamination in the confined ground-water system based on existing and Phase III data. All data will be displayed in tabular form and graphically as appropriate. The work plan simply provides a preliminary interpretation of the existing data.

Page 2 53

Time versus concentration graphs should have been prepared for all or a select set of wells from all geologic units Parameters to be graphed should have included representative analytes from each of the major groups of analytes i.e. metals, radionuclides, organics and major ions. Temporal trends must be presented and explained in the Phase III RFI/RI Report.

RESPONSE

Time versus concentration graphs will be presented and explained in the Phase III RFI/RI Report.

Page 2 53

The conclusion that the groundwater in the unweathered sandstone is not contaminated cannot be stated with certainty in light of the analytical results from well 8-87 The Phase III Investigation should look more closely at well 8-87 This question must be answered through implementation of the remedial investigation

Trilinear diagrams or stiff diagrams should have been plotted up for groundwater in each of the geologic units Background data could be used for this Construction of the diagrams would allow comparison of groundwater in various geologic units Such a comparison is important in the development and presentation of a conceptual model and must be performed during the remedial investigation

RESPONSE

Additional data are necessary to determine whether the confined ground-water system is contaminated. More quarterly ground-water samples are being collected from all bedrock wells to further evaluate bedrock contamination in that vicinity. Trilinear or Stiff diagrams are useful tools in characterizing ground-water quality. These have been presented in previous RI reports and will be presented in the Phase III RFI/RI Report.

Section 2.3.3.2 Major Ions in Unconfined Groundwater

The text describes the maximum concentrations for major ions but these values are not graphically displayed in figures 2-11 and 2-12. The figures present second quarter 1989 data for comparative purposes with sample data from the background investigation. This indicates the need to perform trend analyses. The figures, as they are presented, are misleading. The elevated TDS concentrations at well 43-87 are not specifically described in the text (see response to PRC comments, pg 2 5)

RESPONSE

The maximum concentrations of major ions are not necessarily of greatest utility for presenting the extent of contamination. The second quarter 1989 data is typical of results from previous quarters and was therefore used for graphical presentation. Trend analysis would be useful and will be performed for the Phase III RFI/RI Report. The elevated TDS concentrations observed in well 43-87 is discussed in the Revised Final Phase III RFI/RI Work Plan.

Section 2.3.3.3 Summary of Extent of Contamination

The conjecture that organic contamination is restricted to a small area around Individual Hazardous Substance Site (IHSS) 119 1, one of the multiple solvent spill sites, is not supported. To the contrary, VOC contamination has been detected in wells 0687 and 6486 at 20 parts per billion (ppb) trichloroethene (TCE) and 8J ppb tetrachloroethene (PCE) respectively. Wells 0687 and 6486 are approximately 150 feet and 700 feet downgradient of IHSS respectively. In addition, many of the wells downgradient of IHSS 119 1 have been dry during previous sampling events. Although dry conditions inhibit contaminant migration, the lack of groundwater data from these wells provides little indication of the extent of contaminant transport in the alluvium downgradient of IHSS 119 1. No conclusions regarding the extent of contamination from IHSS 119 1 can be made based on the data provided in the RFI/RI workplan. Slugs of contamination could have been released periodically and their detection could be missed due to sampling frequency or well location. The number of bedrock wells is insufficient to determine the vertical extent of contamination. The workplan should have been designed to verify these presently unsupportable conclusions and the Phase III RFI/RI Report must resolve these issues.

RESPONSE

PCE has been detected only once in well 6486 (8J $\mu\text{g/l}$). It was present below the detection limit and therefore is an unreliable indicator of contamination. The TCE concentration of 20 $\mu\text{g/l}$ in well 0687 is considered part of the localized volatile organic plume downgradient of IHSS 119 1. The additional alluvial and bedrock wells proposed in the revised Final Phase III RFI/RI Work Plan will help define the extent of saturation in surficial and weathered bedrock materials and the nature and extent of the ground-water contamination in these materials.

Section 2.3.4 Surface Water

The Phase III RFI/RI Report must reflect the recent diversion structures from pond C-2. Background values and the surface water results should have been presented in a table for evaluation and must be presented in the Phase III RFI/RI Report.

RESPONSE

The Revised Final Phase III RFI/RI Workplan will include these diversion structures in the Figure and discussion on surface water.

Section 2.3.4.1 South Interceptor Ditch

The contaminants found in surface water should have been compared to those found in the groundwater sediments and soils. The Phase III RFI/RI Report must do this. It is important to correlate the sample results, if possible, in determining contaminant sources and means of migration. Results of the borehole samples collected under the IM/IRA should have been presented or referenced and must be presented in the Phase III RFI/RI Report. Toluene was detected potentially in the IM/IRA borehole samples and may be related to that found in the sample from SW-69. It should have been noted at which sample locations dissolved gross alpha and beta, uranium and plutonium exceeded background. This information must be presented in the Phase III RFI/RI Report.

RESPONSE

It is obvious without doing a direct comparison that many of the contaminants occurring in surface water are those found in the ground water or soils at Operable Unit No. 1. This strongly suggests that ground water recharge or surface water runoff are contaminant transport pathways to surface water. Nevertheless the Phase III RFI/RI Report will provide a detailed comparison of the contaminants found in the surface water to those found in the other media. The results of the borehole samples from the French Drain Geotechnical Investigation will be presented in the Revised Final Phase III RFI/RI Work Plan. The sample locations where the radionuclides exceeded background are also presented in the Revised Work Plan.

Section 2.3.5 Sediments

The sample locations should have been shown on a map. Figure 2-17 does not show the sediment sampling locations (see also response to EPA and CDH comments). The sampling locations must be presented in the Phase III RFI/RI Report. Results of sediment sampling should have been compared with surface water, groundwater and soil sampling results. This must be done in the Phase III RFI/RI Report. The question arises once again about whether the low levels of certain volatile organic compounds in the samples represent contamination especially if present in blanks. Until it can be demonstrated that the presence of these contaminants is due to lab contamination they should be considered present. Additionally not all the volatiles sampled for were in low concentrations.

Background values and sediment results should have been presented in a table. This must be done in the Phase III RFI/RI Report.

RESPONSE

The surface water and sediment sampling locations are presented on Figures 2-20 and 2-21 respectively in the revised Phase III RFI/RI Work Plan. The results of sediment sampling will be compared with other media in the Phase III RFI/RI Report. Chloromethane, acetone, chloroform and TCE will be

considered as possible contaminants, and further investigation is needed to determine if these constituents are site contaminants or laboratory artifacts. Section 2.3.3.3 states that for the purposes of defining the field sampling plan all constituents above background are considered representative of contamination

Background values of sediment are presented in Table 2 10 and sediment results are given in Appendix D of the Final Phase III RFI/RI Work Plan.

Section 2.3.6

The air monitors in the IM/IRA construction site should have been added to this section of the workplan and included in the location map. A map showing the location of the air monitors is necessary and must be presented in the Phase III RFI/RI Report.

RESPONSE

The Revised Phase III RFI/RI Work Plan has been modified to include a discussion of the ambient air monitoring conducted during the 1990 IM/IRA field activities. Figure 2-22 shows the locations of on-site ambient air monitor stations, and Figure 2-23 presents the locations of off-site community ambient air samplers in the revised Final Phase III RFI/RI Work Plan.

Section 2.4 Applicable or Relevant and Appropriate Requirements

The units for VOCs in Table 2 11 should have been $\mu\text{g}/\text{l}$ and not mg/l . Detection limits for Cs and Li were 1 and 0.1 mg/l and not changed to 1 and 0.1 mg/l (see EPA comments). There is a discrepancy between the lab data and the detection limits (the recorded concentration is less than the detection limit and not noted as such). GC is not applicable to metals and inorganics. These corrections must be made in the Phase III RFI/RI Report.

Organic concentrations should be represented in $\mu\text{g}/\text{l}$

RESPONSE

These comments refer to typographical errors all of which have been corrected in the revised Final Phase III RFI/RI Work Plan. It is noted that the ARARs section has been revised significantly and is included in the revised work plan as Section 7.0. The ARARs discussion is consistent with that in the Phase II Work Plan for Operable Unit No. 2. Of note for ground water the Water Quality Control Commission (WQCC) Ground Water Standards are no longer considered ARAR because of their unenforceable status at this time. Also WQCC Surface Water Standards are not considered ARAR for ground water. Both of these state standards are considered TBC.

Page 2 72

This section does not contain a discussion of location-specific or action-specific ARARs. In addition chemical-specific ARARs for soil, sediment, and air media are not given. At a minimum the RFI/RI workplan should have stated these additional ARARs will be identified and reference the submittal (for example the Feasibility Study Report) that will contain the discussion. These issues must be resolved in the Phase III RFI/RI Report.

The discussion of "RCRA Subpart F concentration limits as ARARs is unclear. The intention apparently was to identify the maximum groundwater concentrations specified in 40 CFR 264.94 as relevant and appropriate requirements. These are not "RCRA Subpart F regulations. RCRA Subpart F is an inappropriate citation and should not have been used to reference the Code of Federal Regulations. This must be corrected in the Phase III RFI/RI Report.

RESPONSE

As discussed in Section 7.0 evaluation and establishment of location- and action-specific ARARs are part of the RI and FS processes, respectively. They will be addressed in the RFI/RI and CMS/FS reports. Chemical-specific ARARs for soils/sediments are also addressed in Section 7.0. Investigation of the air medium is not within the scope of the Phase III RFI/RI Work Plan, thus, a discussion of chemical-specific ARARs for air is not included in the work plan. It is recognized that there are several federal and state statutes that regulate air emissions which will be evaluated during the FS as action-specific ARARs.

The RCRA Subpart F terminology has been modified as suggested.

Page 2-74

The ARAR reference should have included citations. Greater discussion of LDR ARARs was needed. In addition, DOE should have presented in table format all potential ARARs associated with a contaminant. (Note: Unlike the OU 2 IM/IRA Decision Document, the concept of "potential ARARs" is appropriate here since we are only in the RFI/RI workplan stage. It is the RI which transforms potential ARARs into actual ARARs for use in identifying and assessing remedial alternatives.) These corrections must be made in the Phase III RFI/RI Report.

The table cites RCRA Subpart F as the ARAR reference for 1,1-dichloroethane, methylene chloride, and carbon disulfide. These constituents are not specifically cited in 40 CFR 264.94. The RFI/RI workplan should have clarified this reference. In addition, land disposal restrictions (LDRs) are cited as the ARAR reference for acetone. A discussion should have been provided regarding LDRs and whether they are applicable or relevant and appropriate to the site. These comments must be addressed in the Phase III RFI/RI Report.

RESPONSE

ARAR references have been revised to include citations where appropriate. LDRs are action specific ARARs relating to land disposal or "placement" and will be addressed with other action specific ARARs in the CMS/FS Report. "Potential" ARARs including the 40 CFR Part 264 Subpart F requirements as they apply to the above noted compounds and others are explained in detail in Section 7.0.

Page 2-80

Since the RCRA Groundwater Protection Standards should be either applicable or relevant and appropriate, it is erroneous to classify background concentrations for cesium and strontium as "TBC." The appropriate RCRA Groundwater Protection Standard ARAR is either ACL or background. However, the cleanup requirements established during the RI/FS process is analogous to the RCRA process to determine ACLs and obviates the need to consider background concentrations as the cleanup standards. Therefore, the sentence classifying background concentration as a "TBC" should have been deleted and the following inserted: "The cleanup levels for these contaminants, as with all other contaminants, will be established upon the conclusion of the Baseline Risk Assessment described in Section 4.6.1." This comment must be addressed in the Phase III RFI/RI Report.

RESPONSE

Cesium and strontium are not hazardous constituents under RCRA, and therefore RCRA is not applicable or relevant and appropriate. However background concentrations for these constituents should not be considered TBC because they are not health-based. With respect to the hazardous constituents for which RCRA is ARAR, background concentrations are identified as TBC as a benchmark for evaluating site data, recognizing that the ACL variance provision will be realized through the conduct of the baseline risk assessment.

Section 2.5 Sampling and Analysis Requirements for Remedial Alternatives Evaluation

Table 2 13 should have included coagulation and precipitation technologies for groundwater and surface water treatment (see PRC comments, pg 2-8) The Phase III RFI/RI Report must address these technologies.

RESPONSE

Coagulation and precipitation are listed in Table 2-21 (formerly Table 2 12). They were not identified in Table 2-22 (formerly Table 2 13) because there are no special data requirements that need be considered in the collection of RFI/RI field investigation data to permit an adequate evaluation of these technologies. These technologies will be addressed in the Phase III CMS/FS Report.

Section 3.1 Phase I and II RI Conclusions

There is indication that soil contamination is present at 14-87 61-87 and 63-87 in addition to 1-87 57 87 and 58-87. This should have been presented and discussed and this issue must be resolved in the Phase III RFI/RI Report.

RESPONSE

The most notable organic contamination occurs at boreholes BH01-87 BH57-87 and BH58-87. Much lower concentrations (below or near detection limit) were reported for boreholes BH14-87 BH12-87 and BH61 87 as discussed in the revised Final Phase III RFI/RI Work Plan. The Phase III RFI/RI Report will present a thorough analysis of all available soil sampling results.

Page 3-2, Section 3.1, Item 5

Ground-water recharge also occurs via movement of water from one aquifer or hydrogeologic unit to another aquifer or hydrogeologic unit. The impact of such recharge must be assessed during the remedial investigation

RESPONSE

Recharge to bedrock sandstones via leakage through overlying claystones is acknowledged in Section 3 1 Item 5

Section 3.2 Site-Specific Phase III RFI/RI Objectives and Activities

The site-specific QAA should have been mentioned in this section

RESPONSE

The site-specific QAA is now referenced in Section 3.3 (formerly Section 3.2) and included in the revised Final Phase III RFI/RI Work Plan as Section 9.0

Section 3.2, Table 3-1

The site-wide geologic and geophysics study activities should be tied into the Characterize Site Physical Features Objective and must be acknowledged in the Phase III RFI/RI Report. Use of the Rocky Flats Environmental Database System (RFEDS) for data evaluation should have been included into the objective of Characterizing the Nature and Extent of Contamination. A QA/QC objective should have been included. Three additional objectives, identifying IM/IRAs for OU 1, identifying and implementing data management procedures, and identifying upgrades to the air monitoring system should have been included in this section and Section 4.1.3 (see CDH comments, pg 3-10)

RESPONSE.

The objectives mentioned have been added to Table 3-1 as described with the exception of identifying IM/IRAs for OU 1 and upgrading the air monitoring system. No additional IM/IRAs are planned for OU 1 and additional monitoring stations are not considered necessary for OU 1

Page 3-4, Table 3-1

Phase III RFI/RI objectives should have included the development of a conceptual hydrogeologic model for the area around Hillside 881 (not a numerical model). This should have included a subsurface geologic model and a hydrologic model. These objectives must be achieved and presented in the Phase III RFI/RI Report.

RESPONSE

Verification of the hydrogeologic site conceptual model for Operable Unit No. 1 presented in Section 2.4 is now included as an objective of the Phase III RFI/RI (Table 3-1). Results of this effort will be included in the Phase III RFI/RI Report.

Page 3.5

Preliminary plume maps for contaminants of concern should have been prepared in the vicinity of all IHSSs. Consideration should have been given to fate and transport modeling. Verified plume maps must be presented in the Phase III RFI/RI Report.

RESPONSE

Preliminary plume maps for Operable Unit No. 1 are presented in Section 2.0 of the revised Final Phase III RFI/RI Work Plan. Verified plume maps will be presented in the Phase III RFI/RI Report.

Section 4.1.1 Task 1 Project Planning

The site-specific QAA should have been referenced. The site-specific Health and Safety Plan and the Standard Operating Procedure Amendments should have been submitted as appropriate. The QAPJP and the SOPs (which together are the Sampling and Analysis Plan or SAP) submitted by DOE were reviewed by the regulatory agencies. Those comments should have been reviewed in conjunction with activities for the OU 1 RFI/RI. A major concern is that the SAP deferred the details to the site-specific plans and the GRRASP and the site-specific plans and the GRRASP have not been submitted. The GRRASP is referenced in this document as are the site-wide SOPs for defining the analytical scope of work. The GRRASP should have been submitted for review or the QAPJP should have been revised to include the pertinent information of the GRRASP. This issue must be resolved prior to approval of this workplan.

RESPONSE

Section 4.1.1 now references the QAA which is included as Section 9.0 of the revised Final Phase III RFI/RI Work Plan. The GRRASP has now been submitted to the regulatory agencies.

Section 4.1.2 Task 2 Community Relations

Site-specific community relations plans are not required for submittal. The interim community relations plan is supposed to cover community relation activities until the final Community Relations Plan is completed. The Interim Plan was not implemented in November 1990.

RESPONSE

A draft Community Relations Plan was submitted to EPA and CDH in November 1990 and is scheduled for finalization in August 1991. The draft Interim Community Relations Plan was implemented in January 1991. Section 4.1.2 has been updated to reflect the new schedule for community relations plans.

Section 4.1.5 Task 5 Data Evaluation

The RFEDS database should have been specifically referenced and the methods of evaluation should have been explained. This information must be provided within the Phase III RFI/RI Report.

RESPONSE

The RFEDS is now referenced in Section 4.1.5. Data evaluation methods will be provided in the Phase III RFI/RI Report.

Section 4.1.5.1 Site Characterization

The site-wide geology and geophysics studies should have been referenced and must be utilized in developing the Phase III RFI/RI Report.

RESPONSE

Site-wide geologic and geophysical study results will be used in developing the Phase III RFI/RI Report. Section 4.1.5.1 has been modified accordingly.

Section 4.1.5.2 Source Characterization

The analytical data from the source boreholes must also be used to determine risk information important to development of the Phase III RFI/RI Report.

RESPONSE

Section 4.1.2 now notes that on-site contaminant concentrations will be used as input to the risk assessment.

Section 4.1.5.3 Nature and Extent of Contamination

The extent of contamination should also have been depicted in cross sections. This must be presented in the Phase III RFI/RI Report. The technique of principal component analysis for identifying the releases from different sources should have been explained and must be explained in the Phase III RFI/RI Report. Hydrogeologic information data along with the chemical data should have been used to investigate the movement of contaminants from one pathway to another. This must be evaluated in the Phase III RFI/RI Report. Nature and extent of contamination via the air pathway should have also been addressed and must also be evaluated in the Phase III RFI/RI Report.

RESPONSE

The extent of toluene in subsurface soils along the French Drain alignment is presented in cross section in the revised Final Phase III RFI/RI Work Plan. Additional cross sections will be provided in the Phase III RFI/RI Report as appropriate. The technique of principle component analysis will be explained in the Phase III RFI/RI report if the technique is used in data evaluation during the RFI/RI. Hydrogeologic and chemical data for ground water and surface water will be used to evaluate movement from one pathway to another. The nature and extent of contamination via the air pathway will be addressed by the Phase III RFI/RI Report.

Page 4-5

Using kriging to contour isopleths generally does not produce accurate plume maps. Be aware of the many limitations of kriging.

RESPONSE

The limitations of kriging are understood and acknowledged in Revision 1 of the Final Phase III RFI/RI Work Plan.

Section 4.1.6 Task 6 Baseline Risk Assessment, Page 4-7

The Endangerment Assessment Handbook has been superseded and should no longer be used.

RESPONSE

The Endangerment Assessment Handbook has been superseded by the Risk Assessment Guidance for Superfund Human Health Evaluation Manual Part A (EPA, 1989a) and the Risk Assessment Guidance for Superfund-Environmental Evaluation Manual (EPA, 1989d). Section 4.1.6 has been revised to reflect this change.

Section 4.1.6.1 Contaminant Identification

The text states all chemicals detected above background concentrations will be treated as site contaminants for the public health evaluation. The method for determining above background" should have been discussed and must be discussed in the context of the Phase III RFI/RI Report.

RESPONSE

Determination that a chemical is above background is discussed in Section 2.3.1. This section is now referenced in Section 4.1.6.1. It is further noted in the text that this "identification of contaminants" will be based on the latest Background Geochemical Characterization Report available when the Phase III RFI/RI Report is being prepared.

Public Health Evaluation Contaminant Identification

As stated in EPA's previous comments (see pg 1-12) chemicals must not be eliminated from further consideration until the exposure assessment phase of the baseline risk assessment is completed. Comparison of site contaminants to ARARs and toxicological summaries is very important (see response to CDH comments, pg 3-12). It is also necessary to attempt to evaluate the data in terms of synergistic effects and evaluate the data in terms of additive effects. Therefore prior to dropping a chemical from further consideration the toxicological synergistic and additive effects must be investigated. This investigation and the results thereof must be presented in the Phase III RFI/RI Report.

RESPONSE

In the response to previous comments (pg 1-12) it was agreed to not eliminate a chemical from further consideration until the exposure assessment is completed. It is not practical to consider additive or synergistic effects of chemicals that are determined to not be site contaminants or for which there is no potential for exposure. On the contrary additive and synergistic effects will be qualitatively discussed in the baseline risk assessment for all contaminants retained after screening.

Exposure Assessment

Exposure pathways presented in the workplan should have included evaluation of transfer of contaminants from one medium to another. Onsite workers are receptors who should be considered. These factors must be evaluated in the context of the Phase III RFI/RI Report.

RESPONSE

Cross transfer of contaminants from one medium to another is considered in the site conceptual model presented in Section 2.4 of the revised Final Phase III RFI/RI Work Plan. On-site workers will be considered potential receptors.

Toxicity Assessment Page 4-11

The term "cancer potency factor" has been replaced by the term "slope factor" in all superfund guidance.

RESPONSE

The terminology has been changed in the revised Final Phase III RFI/RI Work Plan

Section 4.1.6.2 Environmental Evaluation

The Guidance for Data Useability in Risk Assessment (EPA/540/G-90/008) should have been used for guidance in planning the environmental evaluation. The discussion of the biological field surveys is not consistent with the program described in Section 6. This discussion should have reflected the actual information to be obtained from that program. The upper reaches of Woman Creek that will be used as a reference area for comparison with site results should have been defined. This area must be upgradient from all known sites of contamination and must not be affected by wind-blown contaminants. The text repeats a paragraph on pages 4-14 and 4-14. These issues must be addressed in order to develop the Phase III RFI/RI Report.

RESPONSE

The above cited reference was used in the planning of the environmental evaluation although not explicitly stated. The document is now referenced in Section 6.0 of the revised Final Phase III RFI/RI Work Plan. The text in Section 4.1.6.2 has also been revised so that the discussion is general and therefore consistent with Section 6.0. Section 6.0 discusses the use of Rock Creek as a reference area because of its upwind location relative to the prevailing air patterns. The reference to Woman Creek has been deleted from Section 4.1.6.2.

Section 4.1.7 Task 7 Treatability Studies/Pilot Testing

EPA comments, which will be submitted December 20, 1990 regarding the Treatability Study Plan (TSP) should be considered. The TSP submitted did not provide comprehensive plans for treatability studies and did not provide information regarding innovative technologies. The treatability activities related to OU 1 need not be delayed to await the results of the site-wide treatability studies. Table 4-2 should have identified technologies for groundwater and surface water remedial evaluation.

RESPONSE

Section 4.1.7 has been revised to address the following: planning and implementation of treatability studies specific to Operable Unit No. 1; review of treatability studies performed for other operable units and/or interim remedial actions; Rocky Flats Plant involvement with the DOE Integrated demonstration studies; and Rocky Flats Plant involvement with the Superfund Innovative Technology Evaluation (SITE) Program. Table 4.2 has been deleted in that specific plans will be prepared for treatability studies which will be submitted to the regulatory agencies for review.

Section 4.1.8 Task 8 Remedial Investigation Report

The Phase III RFI/RI Report must contain graphical representations of data (i.e., cross sections). Trend analyses must also be provided.

RESPONSE

The Phase III RFI/RI Report will contain graphical data representations and the results of trend analyses.

The Phase III RFI/RI Report must also include the following

Identification of ARARs (chemical-specific and action-specific)

Identification of remediation goals (i.e. the goal is not to meet only the ARARs but also the risk assessment levels)

A discussion of these activities should have been included in the workplan

The Phase III RFI/RI Report must contain a thorough discussion of the bedrock geology and an evaluation of contamination within the bedrock.

RESPONSE

The Phase III RFI/RI Report will include an identification of chemical and location-specific ARARs as well as a detailed hydrogeological and chemical characterization of bedrock geology. The Phase III CMS/FS report will include an identification of remediation goals and action-specific ARARs. Section 4.1.8 and other appropriate sections have been modified in the revised Phase III RFI/RI Work Plan to reflect this comment.

Section 4.2.1 Task 9 Remedial Alternatives Development and Screening

Land ban requirements must also be met during the cleanup process.

RESPONSE.

As previously mentioned, land ban is an action-specific ARAR that will be addressed in the Phase III CMS/FS report for all remedial alternatives involving disposal or placement.

Section 4.2.3. Page 4-24

The Feasibility Study must 1) summarize ARARs identified in the RI, 2) discuss the remediation goals and 3) identify action- and location-specific ARARs that bear on the alternatives analyzed in the FS

RESPONSE

Table 4-2 (formerly Table 4-3) has been modified accordingly in the revised Phase III RFI/RI Work Plan

Section 5 Phase III RFI/RI Field Sampling Plan

The field operations are presented in the Site-Wide Sampling and Analysis Plan which includes the QAPJP and the SOPs. The SAP refers to site-specific quality assurance plans and SOPs which should have been presented here and not referred to the 1989 Operational Safety Analysis document. This paragraph states that precautions may include the containerization of drill cuttings and/or groundwater removed during RFI/RI field activities. Containerization of collected groundwater and drill cuttings is not optional but must follow the approved SOPs.

RESPONSE

The site-specific QAA is provided in Section 9.0 of the revised Final Phase III RFI/RI Work Plan. Containerization of collected ground water and drill cuttings will follow approved SOPs.

Section 5.1 Source Characterization

The SOP (1990) deferred site-specific information to the workplans. The individual OU 1 workplan is referencing the SOP. The site-specific information should have been added if it differs from the SOPs. In new boreholes and wells where contamination is found, additional drilling will be necessary to determine the vertical extent of the contamination. For example, if contamination is found in the surficial deposits, additional characterization will be necessary to determine if the contamination has progressed farther down. Bedrock wells must be installed where borehole sampling indicates bedrock is contaminated (see EPA comments, pg 1.14). These issues must be resolved to develop an acceptable Phase III RFI/RI Report.

RESPONSE

Drilling and sampling procedures which deviate from the SOPs are presented in the revised Final Phase III RFI/RI Work Plan. Bedrock wells will be installed where subcropping sandstones are encountered.

Section 5.1.1.3 Liquid Dumping Site (SWMU Ref. No. 104)

A monitoring well will need to be installed if samples from the boreholes indicate contamination. If contamination is found, the remedial investigation will need to fully characterize it.

RESPONSE

The proposed boreholes are expected to fully characterize IHSS 104.

Section 5.1.1.4 Out-of-Service Fuel Oil Tanks (IHSS Nos. 105.1 and 105.2)

This should have been clarified. Remedial alternatives regarding the underground storage tank removal should be addressed in the FS.

RESPONSE

Remedial alternatives to be considered for IHSSs 105.1 and 105.2 during the FS will include tank removal and remediation of soils and ground water as appropriate.

Section 5.1.1.6 Hillside Oil Leak Site (IHSS Ref. No. 107)

Monitoring well MW17 may need to be moved slightly southward to detect groundwater flowing from under the skimming pond. Groundwater level data will need to be evaluated more precisely to determine the best location for MW17.

RESPONSE

In the revised Phase III Work Plan, the proposed location of MW17 has been moved slightly to the south as suggested (see Figure 5-1 Proposed Borehole and Monitor Well Locations)

Section 5.1.1.7 Multiple Solvent Spill Sites (IHSS Ref. Nos. 119.1 and 119.2)

Proposed well MW23 is not located downgradient of IHSS 119.2 as stated in the response to CDH comments (pg 3-14). Well MW29 will monitor groundwater flowing under IHSS 119.1 and not 119.2 as stated in the response to CDH comments (pg 3-14). The potentiometric surface data should be used to locate well MW25 so that it is downgradient from well 43-87 as contaminants were detected in this well. Soil contamination is indicated at BH15-87 and possibly BH61-87 which require follow-up investigation of soil and groundwater. These issues must be addressed in order to present an acceptable Phase III RFI/RI Report.

RESPONSE

The response to comments was in error. The three monitoring wells downgradient of IHSS 119.2 are MW12, MW13, and MW32.

In the revised Phase III Work Plan, the proposed location of MW25 has been moved slightly west to a location more directly south of existing well 43-87.

No volatile or semi-volatile compounds have been detected in concentrations above the established detection limits for borehole BH61-87 samples. The low concentrations of compounds that were detected do not provide conclusive evidence that this area is contaminated. The existing and proposed boreholes and monitor wells within and downgradient of IHSS 119.2 should provide adequate data for characterizing that source area. Samples from borehole BH15-87 are similar except for one volatile (acetone) and three semi-volatile compounds (phenanthrene, fluoranthene, bis(2-ethylhexyl)phthalate) that were detected in concentrations above the established detection limits. There are potential problems associated with acetone and phthalate analyses (discussed in Section 2.3.2.1 of the Work Plan) that indicate these results may be artifacts of sampling or analytical procedures. The phenanthrene and fluoranthene concentrations are very close to the established detection limits. Because BH15-87 (and BH61-87) are not within defined IHSS boundaries, it is unlikely the soils in these areas are contaminated. If results from the proposed Phase III boreholes indicate contamination with these compounds, it will be conservatively assumed that this contamination extends to these boreholes.

Section 5.1.1.8 Radioactive Site No. 1-800 Area (IHSS Ref. No. 130)

The workplan should have stated the need for careful sampling at this IHSS (see EPA comments pg 1-15).

RESPONSE

Careful sampling will be performed at all sites during the RFI/RI as defined in the QAPJP, QAA, and the SOPs.

Section 5.1.2.1 Chemical Analysis of Soil Samples

Procedures should have been identified and not referred to the GRRASP as the GRRASP was not provided for review with the Sampling and Analysis Plan. Therefore it is not certain what the procedures are. The procedures should be those defined in the Sampling and Analysis Plan and the site-specific plan. EPA comments on the SAP apply to this document as well. This issue must be resolved prior to approval of this workplan.

RESPONSE

The GRRASP has now been provided to the regulatory agencies for review

Section 5.1.2.2 Soil Blanks

The investigation of sample contamination should be ongoing in order to get quality data for evaluation. This issue could precipitate conservative decisions later on in the decision-making process for OU 1. In order to prevent this, DOE must address this issue and resolve it during the Phase III RFI/RI.

RESPONSE.

DOE fully intends to address sample contamination in order to provide the highest quality data, and to avoid unnecessary conservative assumptions regarding contamination

Section 5.2.1.1 Monitor Well Locations

The location of well MW29 is not downgradient of the majority of SWMU 130 (see response to EPA comments, pg 1 1). An additional well located between MW34 and MW35 and near well 55-87 in the Woman Creek Valley Fill is necessary for the characterization described in the section. This location is downgradient from IHSSs 130 and 119 1 (see potentiometric surface map). The seismic study should have been referenced in this section as stated in response to CDH comments (pg 3-15).

RESPONSE

A well has been added to the south of proposed monitor well MW30 as suggested (MW-36)

Section 5.2.1.2 Chemical Analysis of Ground-Water Samples

The sample and analyses procedures used must be those described in the approved site-wide SOPs. If additions or changes to the SOPs are necessary for this workplan then these items should have been addressed specifically. The SOPs should have been referenced here (with page numbers). It is not necessary to describe the SOP procedures in this section.

RESPONSE

Ground water sampling will follow approved site-wide SOPs

Section 5.2.1.3 Hydraulic Testing

An explanation of how the pumping tests in Woman Creek Alluvium will provide the necessary information to determine hydraulic conductivity for all the geologic materials in the 881 Hillside area should have been presented within the workplan (see CDH comments, pg 3-15) The workplan should have explained the selection of locations for the three pumping wells located in Figure 5-2 This discussion is necessary within the text of the Phase III RFI/RI Report.

RESPONSE

Pumping tests in Woman Creek Alluvium will only characterize valley fill alluvium along Woman Creek. Because of the limited saturated thicknesses or low hydraulic conductivity of other materials at the 881 Hillside, pumping tests are not feasible. Drawdown-recovery or slug tests will be used to evaluate the hydraulic conductivity of other geologic materials at the 881 Hillside Area. Areas expected to have the greatest extent of saturated alluvium along Woman Creek were chosen as test locations. This note has been added to the revised Phase III RFI/RI Work Plan.

Page 5-22

It is stated here that the hydraulic conductivity and effective porosity of the Woman Creek Alluvium are known to estimated accuracies of a factor of three and that dispersivity is known to an estimated accuracy of an order of magnitude. This should have been explained within the workplan, including an explanation of how these accuracies were determined This information must be substantiated and presented in the Phase III RFI/RI Report. The hydraulic conductivity value derived from Phase I and II for Woman Creek (1×10^{-3} cm/s) seems low based on the lithologic description of the Alluvium

RESPONSE

Current estimates of hydraulic conductivity effective porosity and dispersivity for the Woman Creek alluvium will be presented in the Phase III RFI/RI Report.

Page 5-25

An explanation of why multiple well aquifer tests are planned only for the Woman Creek Alluvium should have been provided EPA recommends multiple well aquifer tests for the colluvium the Rocky Flats alluvium and the Arapahoe Formation

RESPONSE

Because of the limited saturated thickness or low hydraulic conductivity of other materials at the 881 Hillside pumping tests are not feasible. Drawdown-recovery or slug tests will be used to evaluate the hydraulic conductivity of other units.

Section 5.2.2.1 Surface Water and Sediments Sample Locations

The sediment sample locations should have been shown in Figure 2 17 (see response to EPA comment, pg 1 17)

RESPONSE.

Sediment sampling locations are presented in Figure 2 21 of the revised Final Phase III RFI/RI Work Plan

Section 5.2.3 Surficial Soils

Approved procedures in the Plan for the Prevention of Contaminant Dispersion must be employed during the surface and subsurface sampling. Surface scrape locations 1 2 3 6, 10 11 12 13 16 17 18 and 19 (Table 2-8) all indicate elevated uranium and plutonium. This signifies the need to collect samples on a denser grid and in, and adjacent to IHSSs, more than proposed in the workplan. The lack of this information may force DOE to make conservative judgments regarding contamination which may overestimate the actual risk.

RESPONSE

Additional plans for surficial soil sampling for radionuclides are presented in Section 5.2.3 of the revised Final Phase III RFI/RI Work Plan.

Section 5.3 Evaluation of the Proposed Interim Remedial Action

Hydrogeologic information was obtained through packer testing. The locations of the six boreholes not along the 100-foot centers should have been identified in the workplan and must be presented in the Phase III RFI/RI Report. Piezometers should also be located west of the recovery well location.

The method of sampling along the influent/effluent pipeline alignment for the IM/IRA results in compositing over 5-foot intervals. This will cause significant dilution of potential contaminants and potentially non-representative samples. The criteria for choosing the discrete VOC soil sample should have been provided with the workplan. The methods described do not indicate that they are adequate to determine the appropriate health and safety protocol. This information must be presented in the Phase III RFI/RI Report.

Results of the packer tests and sample analyses should have been provided and summarized within the workplan and must be presented within the Phase III RFI/RI Report.

RESPONSE

The locations of the six boreholes that are off-set to the french drain alignment boreholes are identified and referenced in the revised Final Phase III RFI/RI Work Plan (B303790-B304290). These six boreholes are also included in Figure 2 2 of the revised Final Phase III RFI/RI Work Plan.

One piezometer will be installed east and one west of well 9-74. This is included in the revised Final Phase III RFI/RI Work Plan, and the locations are presented in Figure 5-1.

A Moss sampler retrieved soils in two-foot intervals at 0-2 foot and 2-4 foot depths. Because gravels drastically reduced the volume and quantity of a retrieved sample, an additional sample at 4-6 foot would be retrieved if gravels were encountered in the 2-4 foot interval. A discrete soil sample for VOC analysis from the 2-4 foot or 4-6 foot interval was obtained using a 2 1/2 inch stainless steel sleeve inserted and secured directly at the tip of the Moss sampler. The sample was submitted for VOCs; the remaining material was composited with the 0-2 foot or 2-4 foot material and submitted for the other analytes.

The analytical results of the soil samples will be used to determine the appropriate health and safety protocol for pipeline construction and the soil characterization for proper disposal of excavated soils. The

revised Final Phase III RFI/RI Work Plan will include this clarification of sampling methods and the Phase III RFI/RI Report will discuss health and safety issues and excavated soils disposal

The results of the packer tests are provided as Tables 2-3 through 2-6 in Section 2.2.2.2 of the revised Final Phase III RFI/RI Work Plan.

Section 6.1 Introduction

There is no reason to exclude contaminants because of lack of specific data on ecological impacts. At worst, structure activity relationships, known toxicity in non-target species and/or basic physical/chemical properties provide a basis for qualitative discussion of potential ecologic impact. Further, although the RFI/RI should not be a basic research project in itself, DOE efforts as a whole need to be cognizant of information gaps so that research funds can be allocated appropriately. Thus, identification of potential but poorly studied contaminants could be significant outside of the Region VIII Superfund process.

RESPONSE

The sentence that states determination of ecological impacts will be limited to contaminants whose effects on biota are adequately documented in the scientific literature has been deleted in the revised Final Phase III RFI/RI Work Plan. The statement is inconsistent with the environmental evaluation as proposed.

Section 6.1.2 881 Hillside Contamination

Toluene also seems to be a contaminant present in soil as indicated by sample results from the IM/IRA french drain alignment activities. Other possible contaminants in soil are 2-butanone, pyrenes, and benzenes. The ecological hazard to biota caused by inhalation of plutonium should be reviewed in addition to the hazard caused by ingestion (see pg 6-5). The text states plutonium is not considered an ecological hazard to biota "unless extremely high levels [> 1 microcurie per square meter (Ci/M^2)] occur. It is not clear whether microcurie (μCi) or millicurie (mCi) are meant. The report that this statement was taken from is identified but the basis for the statement is not. The assessment of impacts in the RFI/RI workplan should have discussed the rationale behind the determination of little effect related to a possible constituent of Rocky Flats soils responsible for a great deal of public concern. This position must be justified within the context of the Phase III RFI/RI Report.

RESPONSE

Toluene, 2-butanone, pyrenes, and benzenes have been added to the list of possible. Statements in the text and previous studies that were performed do not rule out inhalation of plutonium as an exposure pathway. Micro has been changed to "milli" as noted. The text in this section now states that the conclusions drawn regarding the ecological effects of plutonium are based on biological measurements and pathological data for Rocky Flats Plant sites and ecologically similar "control" areas.

Section 6.1.3 Protected Wildlife, Vegetation and Habitats

Vegetation The ten federally-listed or proposed plant species should have been listed in the evaluation within the workplan and must be considered during the Phase III RFI/RI

RESPONSE

The ten federally-listed or proposed plant species were not listed because, as mentioned in the text, they are not known or expected to occur at the site. If they do not occur at the site they will not be considered in the Phase III RFI/RI Report.

Section 6.1.4 Scope of Work

The natural resources are not ARARs. ARARs are used along with risk levels to determine levels of cleanup to meet protectiveness standards.

RESPONSE

Natural resources are not ARARs. The sentence was poorly worded and has been modified to identify the federal and Colorado laws as ARARs, as originally intended.

Section 6.2.1 Preliminary Planning

The plans should have taken into account the schedules for OU 1 activities (RFI/RI and IM/IRA) as presented in the IAG to meet the needs of the investigations. The determination as to what constitutes a statistically significant difference in the biological response between tissue samples is not identified in the QAPJP. The environmental evaluation section is missing in the QAPJP. This issue must be rectified prior to approval of this workplan.

RESPONSE

The plans were written in full recognition of the schedules for the OU 1 activities. The QAPJP will be modified to include an environmental evaluation section that, among other details, will address determination of statistically significant differences in biological responses between tissue samples.

Section 6.2.3. Support Documentation

The field sampling plan must be consistent with that provided for the Site-Wide SAP. If specific conditions exist for OU 1 then these should have been identified. Procedures that will be used generally should be presented in the SAP. This problem must be resolved prior to approval of this workplan.

RESPONSE

The Site-Wide SAP has been updated to include Standard Operating Procedures (SOPs) for conduct of the environmental evaluation.

Section 6.2.4 Review of Existing Information

Any information generated from the RFI/RI and IM/IRA studies should have been reviewed

RESPONSE

All relevant information on Operable Unit No. 1 was reviewed. The two previous RI reports and the IM/IRA plan have been listed in Section 6.2.4 of the revised Final Phase III RFI/RI Work Plan.

Section 6.3 Field Investigation (Stage 1)

Sediment information must be collected per requirements listed on page 6-9. The SOPs related to the particular field activity should have been identified.

RESPONSE

Section 6.3.2 has been modified to include a discussion of past and proposed sediment sampling. The proposed sediment sampling includes analysis for grain size distribution and organic carbon, and physical characterization.

Section 6.3.2 Soils

The chemical/hydrologic/geologic model for the 881 Hillside is not well defined at this time. The Phase III investigation must provide the additional information necessary to develop an overall conceptual model.

RESPONSE

A draft site conceptual model for Operable Unit No. 1 has been prepared and is presented in Section 2.4 of the revised Final Phase III RFI/RI Work Plan. A major focus for the Phase III RFI/RI is better characterization of the site contaminant distribution and migration pathways.

Section 6.3.4 Groundwater

The hydrogeologic information and laboratory analytical results from the Phase III investigation program are an integral part of the environmental assessment and must be included. The remedial investigation must evaluate the effects of contaminated ground-water regardless of the depth.

RESPONSE

The comment seems to refer to the term "shallow ground water" used in the text. "Shallow" has been deleted from the text, but it must be recognized that the focus of the ground-water investigation is characterization of the upper hydrostratigraphic unit (includes weathered bedrock). Existing wells in the lower hydrostratigraphic unit (unweathered sandstone) will continue to be monitored on a quarterly basis to provide a definitive basis for concluding that this deep ground water is not contaminated.

Section 6.3.5.1 Vegetation

The workplan states that the criteria will be determined for the selection of key species. The criteria should have been identified in the workplan. At the very least, the method for determining the criteria should have been mentioned. The workplan should have identified any protected species. This issue must be addressed and justification presented within the Phase III RFI/RI Work Plan

RESPONSE

There are currently no known protected species or habitats near the 88 Hillside Area. Criteria for selecting key species are specified in Ecological Assessment of Hazardous Waste Sites (EPA, 1989) and include

- Species of sufficient number to permit statistically significant comparisons within and outside the site
- Species of importance in the food web at the site
- Species which are susceptible to the contaminants of concern.
- Species which can be compared to an unaffected reference area.
- Species of economic value
- Species of social value (endangered, aesthetically valued etc)
- Species of broad applicability to other studied sites.

Section 6.3.5.2 Wildlife

The text identifies benthic macroinvertebrates as probably existing as soft bottom communities in Woman Creek and Pond C-2. The reason for the apparent elimination of harder-bottom communities in Woman Creek is unclear especially because the later inclusion of Surber sampling methods indicates finding something other than soft bottom habitats (riffle habitats discussed page 6-40). The discussion should have been written to concur with the rest of the section or the rest of the section qualified for the unlikelihood of finding aquatic habitat other than those related to soft bottoms. It should be noted that if the stream bottom is in fact made up only of soft sediments, the plan to walk through it while electroshocking will probably make the water too turbid to see any stunned fish. If this is the case an alternative method should have been proposed. This issue must be resolved prior to conducting the environmental evaluation field work so as to prevent a problem within the Phase III RFI/RI Report

RESPONSE

The text of Section 6.3.5.2 has been modified to address both soft and hard bottom benthic macroinvertebrates as both types of benthic organisms will be present in the Woman Creek sediments depending on the reach investigated. Section 6.8.4.4 as pointed out by the commentor presents methods for collection of hard and soft bottom benthic organisms. A SOP will be prepared for each method. In areas characterized by soft bottoms, the stream width is such that electroshocking can be performed by standing adjacent to the stream to avoid stirring up the sediment.

Section 6.4.2 Contaminant Identification

The chemical list used in the evaluation must be comprehensive

RESPONSE

The development of a list of contaminants of concern using EPA methodology will not compromise the quality of the environmental evaluation.

Section 6.5.2 Toxicity Tests

The text states in-situ methods of toxicity testing involve the exposure of "animals in the field to existing aquatic or soil conditions." It is not clear whether laboratory animals will be exposed to these conditions or whether animals that already live in the ecosystem will be exposed to existing conditions. The discussion should have been clarified and more detail provided. The resolution to this issue must be justified and presented within the Phase III RFI/RI Report.

The table identifies exposure points as air, soil, water and vegetation, but identifies exposure point concentration related to soil and sediment, surface water, groundwater and vegetation. Exposure pathways are identified as terrestrial and freshwater. On page 6-29, terrestrial and aquatic ecosystems are identified. As an outline for the environmental evaluation, the same terms and topics should have been used for discussions which are related to each other to reduce the possibility of future confusion. This must be resolved and clearly presented within the Phase III RFI/RI Report.

RESPONSE

The statement regarding in-situ methods is confusing. The statement now reads that the methods will "involve exposing laboratory animals to field (aquatic or soil) conditions." The terminology in Table 6-1 has been changed so that it is consistent throughout the outline.

Section 6.7 Environmental Evaluation Report

Section 7 in the draft environmental report outline must include Woman Creek in the freshwater pathway analysis. The stage I sampling plan may be modified with EPA approval.

RESPONSE

Woman Creek has been added to the freshwater pathway effects characterization in Table 6.1

Section 6.8.2.2 Locations for Periphyton Sampling

The text states the absence of periphyton at any location will result in sampling of periphyton at the nearest downstream location. The method for determining the presence or absence of periphyton is not identified and must be clear before conducting the field work. It is unlikely that a visual review of site conditions will adequately identify the absence of periphyton in any situation other than the absence of water. The procedure to be used should have been identified and must be before entering the field. If that procedure is expected to be visual, the text should have stated this. This problem must be addressed, resolved and presented within the text of the Phase III RFI/RI Report.

RESPONSE

Presence or absence of periphyton on hard substrates can be determined visually without difficulty. Rocks, gravel and other hard surfaces will simply be examined for the presence of algae and other flora. Observing and collecting algae from soft sediments is more difficult. Vacuum suction devices will be used to remove the soft organic surficial sediment layer. Material collected will be screened in the field with the assistance of field microscopes. In this manner relative algal concentrations can be quickly estimated and the appropriateness of the site for detailed analysis can be quickly determined. It is expected that the soft substrate of Pond C-2 will support adequate growth of periphyton to allow accurate species quantitation.

Section 6.8.4.4 Macroinvertebrates

The text states that samples will be placed in plastic jars and reference specimens preserved "in a 70 percent isopropanol solution. It was not clear whether the samples themselves will be preserved. It is unlikely that use of an alcohol solution that starts at 70 percent will be adequate to preserve macroinvertebrate samples. The final solution should be 70 percent for preservation. It should also be noted that the list of equipment on page 6-45 includes 70 percent ethanol rather than isopropanol. The methods and text should have been revised and this issue must be resolved prior to conducting the field work.

RESPONSE

Only those samples where it is necessary to preserve specimens for future reference will be preserved in alcohol. Either ethanol or isopropanol can be used as a preservative, and a 70% solution is of adequate strength for this purpose. For consistency reference is only made to ethanol in the revised text.

Section 6.8.4.5 Fish

Established criteria to determine the number of passes that define "multiple" should have been presented. The text should have discussed the specific number of passes expected for each location. This must be justified and presented within the Phase III RFI/RI Report.

RESPONSE.

The revised text is more specific, stating that one or two passes will be made through the area.

Section 6.8.5 Stage III

The text should have stated the expectation for the sampling program to provide the necessary amounts of biomass.

RESPONSE

The text is explicit in defining the sample mass requirements. There is no control over the quantity of available biomass for sampling.

Appendix B

Data from several 1989 and early 1990 sampling events have not been received by DOE. An explanation of why data is not available for these samples should have been provided. This data must be utilized to develop the Phase III RFI/RI Report.

Soil concentrations in parts per billion reported for BH13-87 indicate methylene chloride concentrations of 27B and acetone concentrations of 15(JB). On a later page for the same surficial unit, the concentrations are 27.9 methylene chloride and 22 acetone. There appears to be a discrepancy in the data which should have been explained. Detection limits appear to be high and possibly are masking low levels of contaminants.

The cover sheet for Appendix B groundwater wells refers to OU 2 instead of OU 1.

RESPONSE

The available data will be used in developing the Phase III RFI/RI Report.

QUALITY ASSURANCE ADDENDUM COMMENTS (These comments are being addressed by SAIC. Their responses will be incorporated into the final document.)

Section 3.1 Data Quality Objectives

Table 1 Characterize the nature and extent of contamination. Item 1 should have addressed the extent of surficial radionuclide soil contamination due to release from the IHSS not just from wind dispersion. This table should have been merged with Table 3-1 in the workplan. It is not clear why this information is repeated in the QAA. The text states that only precision and accuracy can be expressed in purely quantitative terms of the five data quality parameters. Completeness is also a quantitative evaluation and should have been added to the statement.

RESPONSE

Precision and Accuracy

Any non CLP protocols used must be approved by EPA prior to implementation. Table 2 should have given the analytical procedure for all types of analyses.

RESPONSE

Section 3.2 Sampling Locations

The entire discussion of the environmental evaluation does not agree with that presented in Section 6 of the Phase II RFI/RI workplan. The inconsistencies include discussions of timeframes, sample locations, and discussions of procedures. This document and the workplan should have been reviewed side by side and revised for concurrence. As they currently exist, they do not seem to discuss the same program. Information on sample locations should have been included in the field sampling plan within the workplan. This issue must be resolved to EPA's satisfaction prior to approval of this workplan.

RESPONSE

Section 3.7 Quality Control Checks

Lab contamination has been cited as a likely reason for elevated concentrations of acetone, methylene chloride, phthalate, toluene and other chemicals in the environmental samples. Verification of this is necessary. The outcome of this analysis could impact the risk assessment Phase III RFI/RI Report and ultimately the cleanup decision. The means of verifying and preventing any future contamination should have been fully described. The reference used to determine the 30 percent and 40 percent relative percent difference for field duplicate samples should have been given. The percentages may vary with the analytical method. Field matrix spikes and matrix spike duplicates are necessary and the numbers of each should have been identified. The compounds and the concentrations used to prepare the spikes should have been identified. Table 4 lists the QC sample collection frequency but also should have listed the number of samples to be taken based on the workplan.

RESPONSE

Data Validation

The QAA lists a number of guidance documents that will be used for data validation. A specific set of steps should have been listed for the data validation process. The process for data verification should have been added to the QAA if different from those in the QAPJP. This issue must be addressed prior to conducting field work.

RESPONSE

Section 3.9 Data Reduction, Validation, and Reporting

The necessary information concerning field data validation is referenced among several documents but not detailed in any document. This section states "field data validation shall be performed as specified in Section 3.3.3.2 of the QA Project Plan." The cited section of the site-wide QA Project Plan (found on page 23 of the QA Project Plan) notes that field data will be validated on two different levels. The first level of validation involves periodic surveillance during the sample collection activity as specified "by following Rocky Flats Plant standard operating procedures (SOPs) for data validation." (The second validation level involves only a review of the data to ensure correct codes and units were used.) The coordination of the workplan with the site-wide QAPJP and SOP is necessary prior to EPA approval of this workplan.

The following example illustrates the continuing circular nature of the references involving field data validation. A common criterion used in the validation of field data is whether an adequate number of quality assurance/quality control (QA/QC) samples were taken in the field. QA/QC samples include field duplicates, equipment rinsates, trip blanks, field blanks, and matrix spike/matrix spike duplicates. The appropriate SOP for this activity is SOP 1.13 "Containerizing, preserving, handling and shipping of soil and water samples." Section 7.0 of SOP 1.13 (Quality Assurance/Quality Control Samples, page 18) includes descriptions of the types of QA/QC samples discussed above. However, the frequency for collection of these samples is specified in the project specific field sampling plan (FSP). The FSP

(Section 5.0 of the Phase III work plan for OU 1) does not, however contain any information regarding the frequency of collection of field QA/QC samples. Although criteria for validation of field data are referenced in this QAA, the site-wide QA Project Plan the sample storage SOP and the FSP the necessary QA/QC sample frequency information is missing.

Other items that should have been considered (in the site-wide QA Project Plan in the QAA, or in the FSP) include collection of sufficient sample volume adherence to proper preservation techniques, and adherence to chain-of-custody procedures. Information regarding the frequency of collection of QA/QC samples should be appropriately placed in the QA. Other items related to validation of field data would be most useful as part of the site-wide QA Project Plan or the SOP

RESPONSE-

Section 5.0 Instructions, Procedures and Drawings

New procedures will need approval by EPA.

RESPONSE.

Section 6.0 Document Control

Documents relating to the OU 1 IM/IRA should have been added

RESPONSE

Section 11.0

This discussion of test control requirements did not include specific information on the QAA but references the Site-Wide QAPjP. The Site-Wide QAPjP references the QAA and the workplan/FSP and the workplan/FSP does not contain the cited information test control requirements. This must be rectified to EPA satisfaction before approval will be granted for this workplan

RESPONSE

SECTION 3
RESPONSE TO CDH COMMENTS

COMMENT

Executive Summary

The recurring problem of laboratory contamination of soil samples with methylene chloride, acetone and phthalates needs to be solved. If a different laboratory procedure will correct the problem, submit an addendum to the SOP. Are all of the samples in an identical test run contaminated with acetone, methylene chloride and phthalates, or just one and a blank?

RESPONSE

Methylene chloride and acetone are common laboratory solvents pervasive in the laboratory atmosphere. However, laboratory contamination of samples with these constituents can be controlled, e.g., segregating solvent extraction activities from GC/MS analysis. All attempts will be made to prevent samples from being contaminated in the laboratory so that the quality of the data is not compromised. Soil blanks will also be used to ascertain sampling and/or laboratory contamination with these solvents as well as with phthalates (see Section 5.1.2.2). Previously collected samples were analyzed using an inappropriately small sample size that compounded the laboratory contamination problem. These problems have now been corrected.

Section 2.1 881 Hillside Area Previous Investigations

Where are the results of the geophysical surveys using electromagnetometry, resistivity magnetometry, and metal detection?

RESPONSE

The results of the geophysical surveys mentioned are given in Appendix B, Volume V of the Phase II Draft Final Remedial Investigation Report.

Section 2.2.1.1 Surficial Geology

Does the term "artificial fill" refer to fill brought into the plant from an off-site area or is it anthropogenic, manmade material?

RESPONSE

The artificial fill is both natural fill generated from the excavation of Building 881 and fill that was placed in IHSS 130 from both manmade and natural sources (see Section 1.4.8 Radioactive Site 800 Area #1) (IHSS Ref. No. 130). The distinction will be made in the revised Final Phase III RFI/RI Work Plan.

Section 2.2.2.1 Unconfined Flow System (Ground-water Flow Rates) pg. 2-16

The ground-water velocity measured using actual contaminant movement is 11-13 ft/yr and the calculated ground-water velocity based on geometric mean hydraulic conductivity and assumed effective porosity is between 1035-3100 ft/yr. What does this large difference in ground-water velocity suggest about both techniques used to measure ground-water velocity? What ground-water velocity should be used for design and placement of collection systems?

RESPONSE

The RFI/RI Work Plan states the rate of organic contaminant movement is less than 11-13 feet/yr in colluvium on the 881 Hillside in the vicinity of IHSS 119-1. This rate is based on organic contaminants in ground-water moving less than 200 feet in 15 to 20 years. This represents an estimate of organic contaminant migration rate, not ground-water velocity. The solvent contaminants at the 881 Hillside will not travel at the ground-water velocity rate because of volatilization and adsorption. The 1035-3100 ft/yr velocity quoted by the commentor represents the hydraulic conductivity of the Woman Creek Valley fill alluvium which is not equal to the ground-water velocity. Ground-water velocity or average linear velocity is a function of the hydraulic conductivity, volumetric porosity, and hydraulic gradient. The ground-water flow velocity for the Woman Creek valley fill ranges from 326 to 650 ft/yr.

Section 2.3.3.2 Inorganics (pg 2-62)

Typographical error in occurrence of tritium above background in wells 52-87 and 69-87. Well 69-87 should be 69-86.

RESPONSE

This has been corrected in the revised Final Phase III RFI/RI Work Plan.

Section 2.3.5 Sediments (pg 2-69)

A sediment sample map should be provided to aid review of the laboratory sediment findings.

RESPONSE

This map has been provided in the revised Final Phase III RFI/RI Work Plan (Figure 2-21).

Table 2-13 Remedial Technology Data Requirements (pg 2-83)

At the recent conference of Remediation of Radioactive/Mixed Waste Sites in Scottsdale, AZ, Dr. Gloria Patton and Dr. James Epler with the USDOE Office of Technology Development, Office of Environmental Restoration and Waste Management presented several innovative technologies dealing with radioactive/mixed waste which are under study for use at various DOE facilities. One of the technologies, which has been studied at Rocky Flats by Jack Blakslee, involves ferrate ions (Fe^{6+}) to complex radionuclides. The trade name of this process is TRU-CLEAR. All of the innovative technologies dealing with radioactive/mixed waste currently under review by DOE should be included in the remedial technology assessment.

RESPONSE

The ferrate process was evaluated for the 881 Hillside FS and will be reevaluated for the OU 1 CMS/FS. The Rocky Flats Plant will participate in the DOE Office of Technology Development integrated demonstrations and the EPA Superfund Innovative Technology Evaluation program.

Table 3-1 Phase III RFI/RI Objectives and Activities (pg 3-4)

Identification of the source of the plutonium in sediment and surface water in Woman Creek should be included on this table of objectives, under "Characterize the Nature and Extent of Contamination"

RESPONSE.

This point has been included as objective 5) in Table 3-1 under "Characterize the Nature and Extent of Contamination" in the revised Final Phase III RFI/RI Work Plan.

Section 4.1.3 Task 3 Field Investigation (pg 4-3)

Section 1 4 3 IHSS Ref No. 104 states that there were empty drums disposed of in IHSS 104. A survey to verify the location and presence or absence of the drums should be included in the list of Field Investigational Activities.

RESPONSE

Appendix B Volume V of the Phase II RI Report presents the results of several geophysical surveys performed on the 881 Hillside in 1987. Figure 2 of the report shows no magnetic anomalies in the vicinity of IHSS 104. Therefore, it is concluded that the empty drums no longer exist in the vicinity of IHSS 104 and no further geophysical surveys are deemed necessary.

Section 4.1.6 Task 6 Baseline Risk Assessment (pg 4-5)

A complete literature search including DOE studies of the effects of individual and combinations of contaminants of concern should be done prior to entering the field to collect specimens. Have similar risk assessments been performed at the Oak Ridge and Hanford DOE facilities?

RESPONSE

It is assumed that the commentor is referring to the environmental evaluation as this activity will involve field sampling and collection of specimens. As described in Section 6.0 the first phase of the environmental evaluation is to conduct a thorough literature search that includes review of documents pertaining to the Rocky Flats Plant as well as documents relating to other DOE facilities that are germane to this investigation.

Section 4.1.6.1 Public Health Evaluation. Exposure Assessment (pg 4-9)

The on-site workers should not be regarded as a "potential exposure population" At the present moment the on-site workers are the most likely exposure candidates next to the actual remediation workers.

RESPONSE

For the purposes of preparing a work plan, all receptors are considered "potential" The baseline risk assessment will document expected or actual exposure of receptors to the site contaminants.

Section 4.1.6.2 Environmental Evaluation (pg 4-13)

At the top of the page the workplan states that aquatic invertebrates and terrestrial organisms will be used to determine whether or not they have been adversely affected by contaminants. The bottom paragraph states that biomarkers for sublethal stress include skeletal abnormalities such as lordosis and scoliosis. Assuming a "terrestrial organism" refers to small lower order animals without vertebrates, how does DOE intend to diagnose scoliosis in aquatic invertebrates?

RESPONSE

Terrestrial organisms encompasses vertebrates and invertebrates. A skeletal abnormality would not be an appropriate biomarker for sublethal stress for an invertebrate. It should be noted that this section has been modified to discuss, in general terms, the environmental evaluation. The section makes reference to Section 6.0 for details of the environmental evaluation plan.

Section 4.1.7 Task 7 Treatability Studies/Pilot Testing (pg 4-14)

The Draft Treatability Studies Plan submitted September 21 1990 does not address any innovative technologies only conventional technologies

RESPONSE

Treatability studies will not be limited to conventional technologies. This section in the revised Final Phase III Work Plan discusses evaluation of both innovative and conventional technologies in the Site-Wide Treatability Study Program as well as treatability studies designed specifically for OU 1 and other OUs. This section has also been modified to note the Rocky Flats Plant involvement with the DOE Office of Technology Development Integrated demonstrations and the EPA Superfund Innovative Technology Evaluation program. Information developed from all of these programs will be available to support the 881 Hillside Area CMS/FS

Table 4-2 Technologies Identified for Treatability Studies (pg 4-15)

The list of technologies is too short and should include many of the innovative technologies under study by DOE Office of Technology Assessment.

RESPONSE

Table 4-2 has been deleted in the revised Final Phase III Work Plan because it is not necessary at this time to define (and possibly limit) the scope of treatability studies for Operable Unit No. 1. Specific plans will be prepared for treatability studies specific to Operable Unit No. 1

Section 5.3.1 Borehole Locations (pg 5-37)

On two different occasions during 881 inspections of the borehole drilling "Division personnel were informed by Greg Litus that there had been several toluene hits of unknown origin. What are the results of the lab tests and DOE's conclusions about the source and extent of the toluene? We were also informed that some of the boreholes were redrilled because the first boreholes caved in during the 881 construction shutdown while air monitors were installed"

RESPONSE

It has been hypothesized that Coherex is the source of the toluene observed during the French Drain Geotechnical Investigation. Coherex has been used as a dust suppressant/soil stabilizer both before and during the Phase II RI field activities of 1986 and 1987. The Material Safety Data Sheet (MSDS) for Coherex does not discuss toluene as a component but mentions petroleum distillates as a major constituent. Toluene may also have been used as a thinning agent to reduce the viscosity of the Coherex before application. Several proposed tests to confirm Coherex as the toluene source are being discussed. In addition, 4 boreholes will be drilled and sampled to evaluate the extent of the toluene contamination downgradient of the 881 Hillside as discussed in Section 5.1.1 of the revised Final Phase III Work Plan.

Section 6.1.2 881 Hillside Contamination (pg 6-3)

The radionuclides listing under Groundwater should include plutonium

RESPONSE

Plutonium has been added to the list of contaminants.

Section 6.1.2 (pg 6-5)

Copper, mercury, tin, cobalt, and nickel act as biocides to certain species at low concentrations. Are any of the certain species present at Rocky Flats? If so, please identify them.

Before actual field sampling is done, it would be worthwhile to identify four parameters for each species to be sampled.

- 1) *Identify the contaminant to be studied*
- 2) *Identify an appropriate group of receptors which suffer some documented quantifiable detrimental effects from exposure to the contaminant chosen*
- 3) *Pick a specific species from the list of receptors which is known to exist at Rocky Flats*
- 4) *Have an experimental laboratory procedure in place ready to receive specimens and measure the deleterious effects of the identified contaminant.*

If no receptor which exists at Rocky Flats Plant can be identified and exhibits documented quantifiable detrimental effects from exposure to the contaminants in question, then risk assessments will have to be made from the best available data found from extensive well-documented literature search. It is

unacceptable to conduct experimental research for a risk assessment without the above parameters

RESPONSE

Section 6.1.2 discusses the potential impact of metals on biota when present in sufficient concentrations. The approach described by the commentor is not different than that proposed in Section 6.0. All potential receptors will be identified, and testing will be performed to determine any detrimental effects due to exposure to site contaminants. If detrimental effects are not found it will not be necessary to perform a literature search to complete the risk assessment. In fact, the literature search is the first phase of the environmental evaluation that focuses subsequent sampling and testing efforts.

Section 6.3.5.1 Vegetation (pg 6-16)

Are any of the species of grasses or wetlands vegetation listed in this section known to be sensitive to or suffer measurable detrimental effects on exposure to the contaminants present at Rocky Flats?

RESPONSE

This will be determined during the environmental evaluation.

Section 6.8.4.5 Fish (pg 6-40)

Does any historical data exist on the fish populations in Woman Creek? What is to be gained by doing population studies on the fish presently in Woman Creek if there is no background or historical data to compare it to? How many of the fish are likely to be killed? The procedure makes no mention of whether or not the fish will be returned to the waters of Woman Creek. We do not recommend that fish studies or any other ecological studies on plants and animals be conducted without a well designed experimental and laboratory procedure in place before any sampling is done

RESPONSE

Previous studies have been performed on fish and are identified in the Radioecology and Airborne Pathway Summary Report. Regardless of previous studies, the proposed environmental evaluation calls for use of reference areas for comparative analysis. It is difficult to predict at this time how many fish will be killed. If the commentor believes the proposed ecological study plan is not well designed it will be necessary to receive more specific comments in order to further discuss any perceived shortcomings.

QUALITY ASSURANCE ADDENDUM COMMENTS

General

There are major portions of the QA plan missing entirely and many others which are indeterminate. The final version of the Quality Assurance Project Plan for the Interim Remedial Action Operable Unit 1 Phase I-A, did an adequate job for the construction drilling and air monitoring activities which Phase I-A covered. All of the appropriate parts of the Final Version Quality Assurance Project Plan Phase I-A for drilling and air monitoring activities should be lifted in its entirety with appropriate revisions and included in the Phase III RI/RFI Quality Assurance, since additional drilling activities, boreholes and soil sampling, and air monitoring are continued activities in Phase III.

Section 1.2 Objectives lists nine activities to be performed as part of the field investigation. Five of the nine activities do not have any project plans, one or two pages of incoherent fragmented material does not constitute a project plan for performance of aquatic and terrestrial field surveys for example.

Each of the nine activities should have a QA Project Plan associated with it.

- 1) *Drill and sample soils and wastes within IHSSs*
Major portions of the QA Phase I-A IM/IRA project plan for drilling can be adopted with appropriate revisions, and deletions for example, references to the french drain line
- 2) *Install and sample ground-water monitoring wells.*
Again the format for drilling boreholes can be adjusted for installation of ground-water monitoring wells.
- 3) *Determine sediment composition and quality grain sizes and total organic carbon*
The sole reference to sediment sampling consists of two whole lines on page 28 and a list of three sediment stations to be sampled. Where is the project plan for determination of sediment composition quality grain size and total organic carbon?
- 4) *Perform aquifer tests and geotechnical tests.*
We were unable to locate a single reference to these activities in the QA. What aquifer and geotechnical tests are to be performed at 881? What sites are the aquifer and geotechnical tests to be performed on? What pieces of information are expected to be gained from the aquifer and geotechnical tests? A project plan for aquifer and geotechnical tests must be included in the QA Phase III RI/RFI
- 5) *Assess air quality*
The project plan for assessment of air quality can be taken with few modifications from the Final Version Phase I-A IM/IRA.
- 6) *Perform aquatic and terrestrial field surveys*
This is the most incoherent ill designed project plan in the QA. What species are being sampled? How are they being sampled? What are they being sampled for? Is there a laboratory protocol in place to receive the samples? Tissue samples cannot be treated in the same manner as soil and rock samples. The project plan for aquatic and terrestrial field survey must be rewritten
- 7) *Collect surface water and sediment samples.*
An eight line reference to surface water sampling locations does not constitute a project plan for surface water sampling. The project plan for collection of sediment samples could be included in the third activity project plan. The absence of a surface water project plan needs to be addressed

- 8) *Collect and analyze terrestrial and aquatic vegetation and animals. One project plan could conceivably cover activities six, eight and nine. If scientific substantiated documented literature searches cannot identify a plant or animal species living at Rocky Flats with a quantifiable biomarker or other measurable indicator of contaminant effects, then a baseline risk assessment should be performed using environmental evidence gathered from other studies of both real life data and experimental studies of contaminants done in academic settings.*
- 9) *Perform toxicity tests to measure the effects of contaminated environmental media on representative species. We are unable to find a single reference to any toxicity test in the QA. The project plan for toxicity tests should include species, test, and laboratory procedures.*

The SOP reference chart sandwiched in the middle of the environmental evaluation does not have any key associated with it. What do the black dots indicate?

RESPONSE